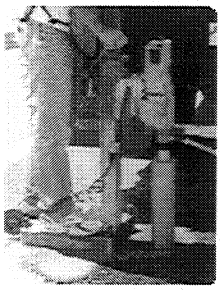
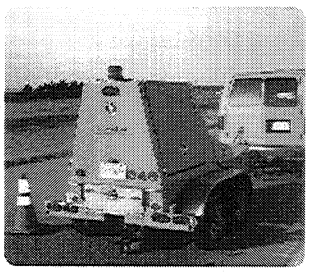
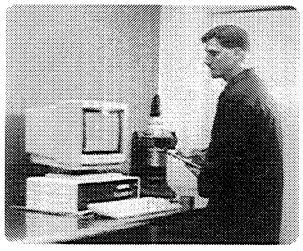
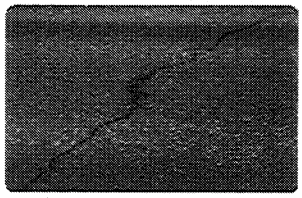
Montana Department of Transportation
Contract #HWY-306041-DT
Performance Prediction Models

Field Investigation Report




August 2002

MDT Highways and Engineering Division

"To survey, design, acquire the right-of-way, and construct safe, cost effective highway improvement projects in order to develop and maintain a cost effective, efficient, and safe transportation system."

Table of Contents

FIELD INVESTIGATION REPORT

Introduction

The Montana Department of Transportation (MDOT) contracted Fugro-BRE to develop performance characteristics of flexible pavements in Montana and use these characteristics in the development of deterioration/performance models. A comprehensive performance monitoring and laboratory-testing program is currently underway to accomplish this objective.

Currently, ten additional sites in Montana have been added to the Long Term Pavement Performance (LTPP) sites from Montana and the surrounding States for this study. Field investigation work was required for these sites to develop a better understanding of the pavement layer structure and material properties.

Field Investigations

In April 2002, a team comprised of personnel from Fugro-BRE, Parsons Brinckerhoff (PB) and MDOT staff conducted field investigations on the ten additional Montana sites added to this study. The team consisted of Weng On Tam and Brian Killingsworth from Fugro-BRE; Brian Schlauch from PB; and Greg Zeihen, Dan Mayberry, Sam Mitchell, John Winfield and Ray Nydegger from MDOT.

A summary of the materials sampled can be found in the field reports for each site in Appendices A through J. Table 1 shows the testing schedule and Appendix location for the ten sites.

Table 1 Testing Schedule and Appendix Location of the Ten Additional Sites

Site	Roadway	Date	Appendix
Silver City	S-279	April 15, 2002	A
Beckhill/Deerlodge	I-90	April 16, 2002	B
Perma	S-382	April 17, 2002	C
Condon	P-83	April 18, 2002	D
Hammond	N-23	April 23, 2002	E
Wolf Point	P-25	April 24, 2002	F
Fort Belknap	P-1	April 25, 2002	G
Roundup	N/P-14	April 30, 2002	H
Lavina	N/P-14	May 1, 2002	I
Geyser	P-57	May 2, 2002	J

Twenty-foot bores were conducted to determine the layer thickness information as well as to check for the presence of a shallow rigid layer that may affect the backcalculated

pavement moduli. Two ten-inch diameter asphalt concrete cores were taken to determine mix design properties from the asphalt concrete mixture. These include the air void content, gradation, and asphalt binder viscosity. Twelve six-inch asphalt concrete cores were taken to determine material properties for use in performance prediction.

To characterize the underlying layers, cores of the cement-treated bases were taken to determine their properties (compressive strength and elastic modulus), and samples of the unbound layers were taken to determine their resilient modulus and moisture content.

Laboratory Materials Testing

Laboratory materials tests will be performed to measure the properties needed for the distress prediction models. Testing on the samples recovered from the field investigation will be conducted at Fugro and AAT (Advanced Asphalt Technologies). AAT will conduct the mixture performance tests in their laboratory in Sterling, Virginia. Fugro will conduct all the other tests in the laboratories in Austin and Houston, Texas. Table 2 shows the testing schedule for materials from the ten sites.

Annual Monitoring Program

The annual monitoring program will be consistent with the Long Term Pavement Performance (LTPP) program except a higher frequency of data collection will be implemented for this project. The annual monitoring project will include Falling-Weight Deflectometer (FWD) tests, condition surveys to identify and measure the types and extents of distress at the site, ride quality, and rut depths (determined by transverse profiles).

Deflection Testing. The first round of deflection testing was conducted in October 2001 and the second round in April 2002. A summary of the deflections measured for each site during the first round of testing can be found in the appendices. The project team is processing deflections from the second round of testing. With pavement layer thicknesses determined from the field investigation in April 2002, Fugro-BRE will use backcalculation procedures to determine the pavement layer moduli for the test sections.

Profile Testing. The first round of profile testing was conducted in October 2001. The resulting International Roughness Indices (IRI) for each of the sections are summarized in the appendices.

Manual Distress Surveys for each of the sites were conducted using the LTPP Distress Identification Manual. Several of the sites had chip seals and showed relatively little distress.

Table 2 Laboratory Materials Testing Plan for the Ten Additional Sites

Materials Test	10 to 12-inch Cores	4 to 6-inch Cores	Cement Treated Base	Aggregate Base & Subbase	Subgrade Soil
Rice or Maximum Specific Gravity	√ - 2				
Bulk Specific Gravity		√ - 12			
Extract Asphalt	√ - 2				
Gradation of HMA	√ (1)				
Viscosity	√ (2)				
Repeated Load Resilient Modulus		√ (3)		√ (5)	√ (5)
Indirect Tensile Strength & Failure Strain		√ (3)			
Creep Compliance		√ (4)			
Compressive Strength			√ - 4		
Elastic Modulus			√ - 4		
Moisture Contents					√ - 2 Borings

(1) The gradation of the HMA mixtures is only needed for those projects where the construction files do not have this information. If the gradation is available, gradation tests do not need to be performed.
(2) The viscosity is to be performed on the extracted asphalt at three temperatures – 275, 140, and 70.
(3) The resilient modulus is to be measured on specific cores and then followed by the indirect tensile strength test. Six cores (3 from the wheel path area and 3 from the between wheel path area) will be tested. Two cores will be tested at 40, two at 60, and two at 80 °F. The LTPP protocols for the resilient modulus and indirect tensile strength testing will be followed.
(4) The creep compliance testing for low temperature characterization will be conducted on 6 cores. Two cores will be tested at a –20, two at –10, and two at 0 °C, in accordance with the LTPP test protocols. The creep compliance tests will be followed by the indirect tensile strength test at each temperature in accordance with the LTPP protocol.
(5) Two test specimens will be compacted and tested from each site for the aggregate base materials and subgrade soils. These repeated load resilient modulus tests will be performed in accordance with the LTPP test protocols.

Summary

This report compiles the field investigation work conducted by the project team in April 2002 as well as the raw data collected from the first round of manual distress surveys, deflection testing, and profile testing. The appendices contain the field data collected from each of the ten sites. Each appendix contains the location, pavement structure, summary of materials sampled, bore logs, distress survey maps and summary, FWD deflections, and profile data for one site.

The materials testing plan is being finalized, and preparations for testing the samples are underway. Quality control checks are being conducted on the manual distress surveys, FWD deflections, profile data, and any necessary post-processing is underway. All the results from the materials testing and annual surveys will be used in the local calibration of the 2002 Guide models for Montana.

APPENDIX A

SILVER CITY

Montana Performance Prediction Models Contract
Field Data Report

Location:	Silver City
Longitude:	112°11' W
Lattitude:	46°45' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	5.1	4.7	4.9	Chip Seal
2	Base	7.0	7.0	7.0	Dark Brown Sandy Clay
3	Subgrade	-	-	-	Gravelly Clay

Materials Sampling

Date: 4/15/02

Material Type	Quantity	Comments
ACP	14 cores	2-10" & 12-6" cores
Base	2 bags	2 additional bags
Subgrade	7 bags	1 split spoon

SHRP-LTPP

SHRP REGION _____ FIELD MATERIAL SAMPLING STATE CODE _____

STATE MT AND FIELD TESTING SHRP ASSIGNED ID _____

LTPP EXPERIMENT Silver Creek E ROUTE/HIGHWAY S-279 Lane _____ Direction WB

SAMPLE/TEST: (a) Before Section V#1 (b) After Section _____ FIELD SET NO. _____

6" Asphalt

LOG OF SHOULDER PROBE

OPERATOR Dan / Sam EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-15-02 LOCATION STATION: RP-9 SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1		~7" brn base course	
2		dk brn clg some fine gravel Subgrade	
3	3.0'		
4		lt brn gravelly clg	
5			
6			
7			
8			
9			
10			
11		coarse Ls gravel	
12			
13		lt brn gravelly clg	
14			
15			
16		coarse Ls gravel	
17		lt brn gravelly clg	
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
_____-_____-19__
Date

SHRP-LTPP

SHRP REGION _____ **FIELD MATERIAL SAMPLING** **STATE CODE** _____

STATE MT **AND FIELD TESTING** **SHRP ASSIGNED ID** _____

LTPP EXPERIMENT Silver City (W) ROUTE/HIGHWAY S-279 Lane _____ Direction WB

SAMPLE/TEST: (a) Before Section _____ (b) After Section V #2 **FIELD SET NO.** _____

4.6" Asphalt

LOG OF SHOULDER PROBE **DCG SHEET: 08**

OPERATOR Dan M. EQUIPMENT USED _____ SHEET NUMBER 1 OF 1

AUGERING DATE 4 - 15 - 02 **LOCATION STATION:** _____ **AUGER PROBE NUMBER** _____

TOP OF ROCK BASED ON: _____ **OFFSET:** _____ **feet from °/s**

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	.7"	Base Course Lt brn sandy gravel	
2		Subgrade dk brn sandy cly	
3	2.5		
4		lt tan brn gravelly cly	
5			
6	5.5		
7			
8		lt brn clayey gravel	
9			
10	10.0		
11	11.0	coarse LS & shale gravel	
12			
13		org brn gravelly cly	
14			
15	15.0		
16		coarse LS & shale gravel w/cly	
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N **DEPTH TO REFUSAL:** _____ **(FEET)**

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ____-____-19__
Date

Project No. 08021 Control No. SAME

Project Name RESURCE PROJ Sta.: SILVER CITY

Core Log. No. CL-3-13-02 Hole No. 1

Driller MAYBERRY Crew SAM Geotech GREG & WILSON

Date 4/15/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FINGER

Elev. _____ Water Level _____ Pipe Installed _____

Comments:

0.0-- 10" ASPHALT	SPT/SHELBYS	PSI	RATE
0.6 - SANDY BR	1.0 - 2.5	NO COUNTS	
GRAVEL	2.5 - 4.0	NO COUNTS	
20.0 - BOH.	BAG SAMPLES	1.0 - 2.5	0.7 -
		2.5 4.0	
	DRILLED TO	20.0 NO SAMPLES	

Project No._____ Control No. 08021

Project Name RESEARCH PROJ - Sta.: SILVER CITY

Core Log. No. CL-3-14-02 Hole No. 2

Driller MAYBERRY Crew SAM Geotech GREG & WOOD

Date 4/15/02 Drill SIMCO Shelbys_____ # Bag Samples_____

Drilling Method - Augers 8" Casing_____/Size_____/Bit FGR

Elev._____ Water Level_____ Pipe Installed_____

==========

Comments:

==========

0.0-- ASPHALT 0.6	SPT/SHELBYS	PSI	RATE
BROWN SANDY	0.7	BAG	
GRAVEL	1.0-2.5	SS &	BAG
20.0	2.5-4.0	SS &	BAG
BOH			
	DRILLED TO	20 NO	SAMP

Montana Performance Prediction Models Contract
Field Data Report

Location: Silver City
Longitude: 112°11' W
Lattitude: 46°45' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/15/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	0	0	0
	Length (Meters)	0.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Silver City
Longitude: 112°11' W
Lattitude: 46°45' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/15/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL	
		N/A	
SURFACE DEFORMATION			
9	RUTTING - REFER TO PROFILE DATA		
10	SHOVING		
	(Number)		0
	(Square Meters)		0.0
SURFACE DEFECTS			
11	BLEEDING		
	(Square Meters)		0.0
12	POLISHED AGGREGATE		
	(Square Meters)		0.0
13	RAVELING		
	(Square Meters)		237.5
MISCELLANEOUS DISTRESSES			
14	LANE-TO-SHOULDER DROPOFF - Not Recorded		
15	WATER BLEEDING AND PUMPING		
	(Number)		0
	Length of Affected Pavement		
	(Meters)		0.0
16	OTHER (Describe)	Recently chip sealed. Raveling of chip seal is the only distress.	

Silver City

Reviewer: _____ Surveyors: AT/EK

Date: _____ Date: 4/15/02

Pavement Temp:

Before_____ After_____

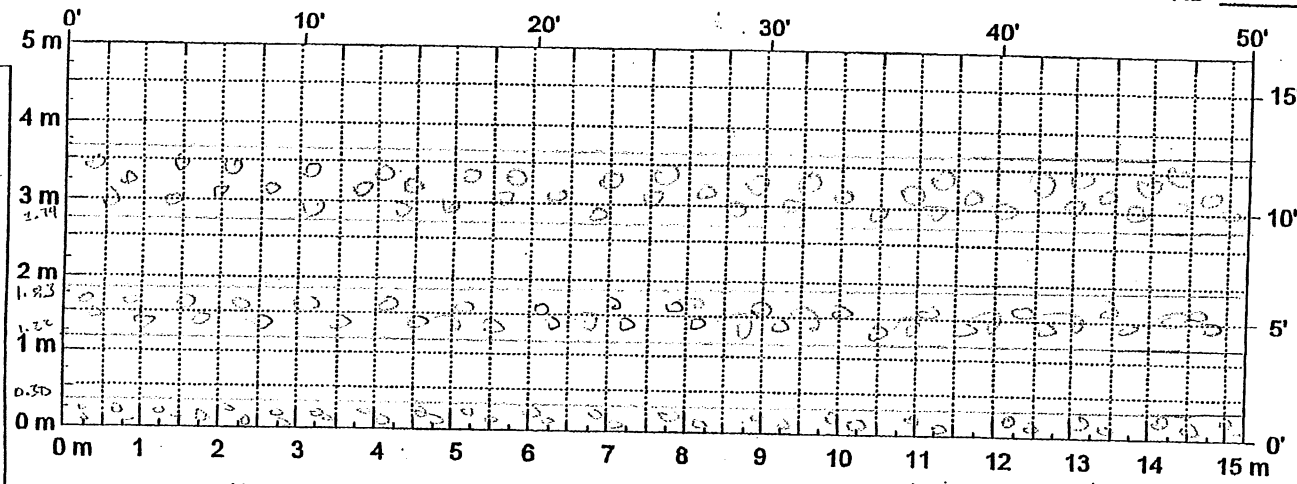
State Assigned ID _____

State Code _____

SHRP Section ID _____

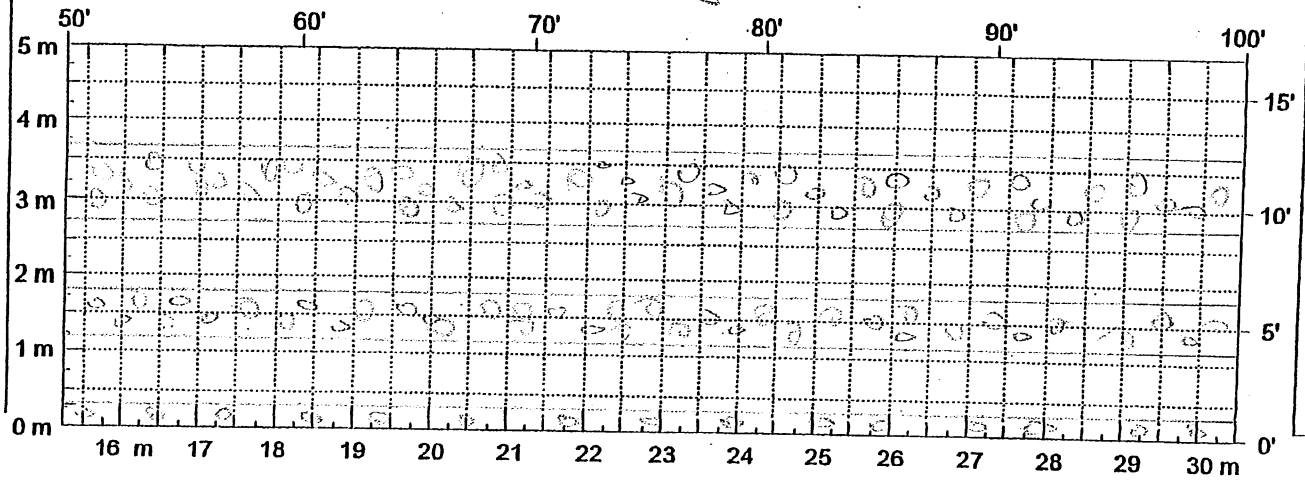
Section Summary

13 @ 0.30 x 101.19 +
0.61 x 112.47 +
0.91 x 152.4
= 237.46 m²



Sheet Summary

Comments: *Entire section was recently chip sealed



Comments: _____

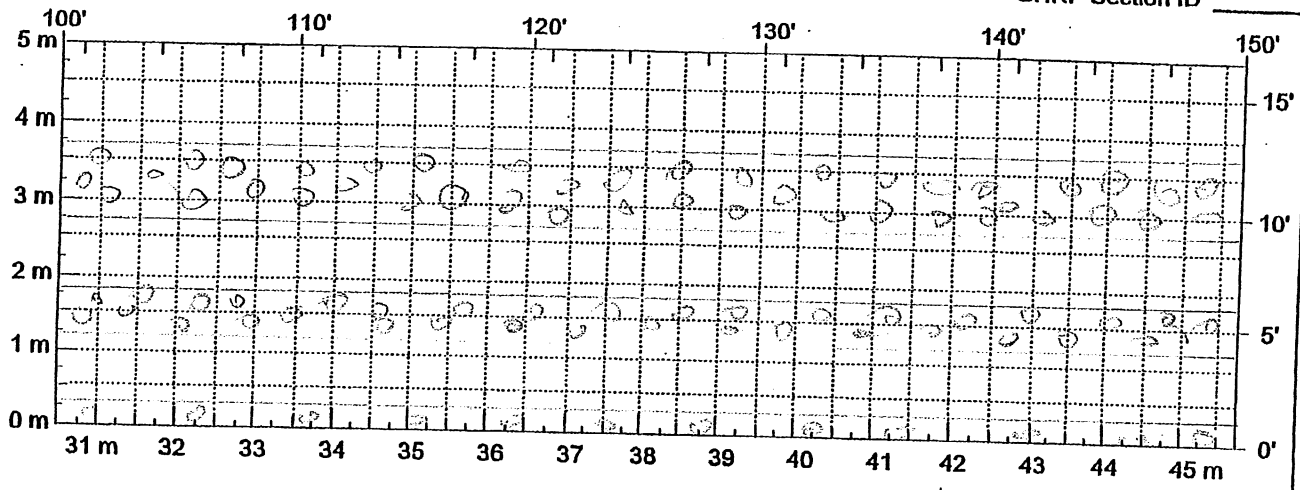
Reviewer: _____ Surveyors: [illegible]

Date: _____ Date: 4/15/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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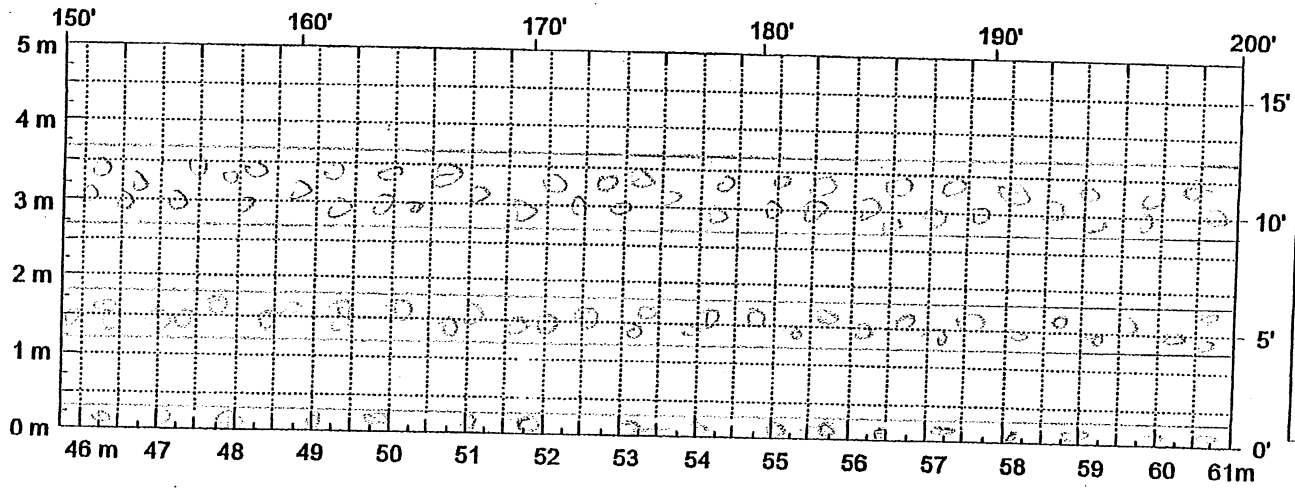


Comments: _____

Sheet Summary

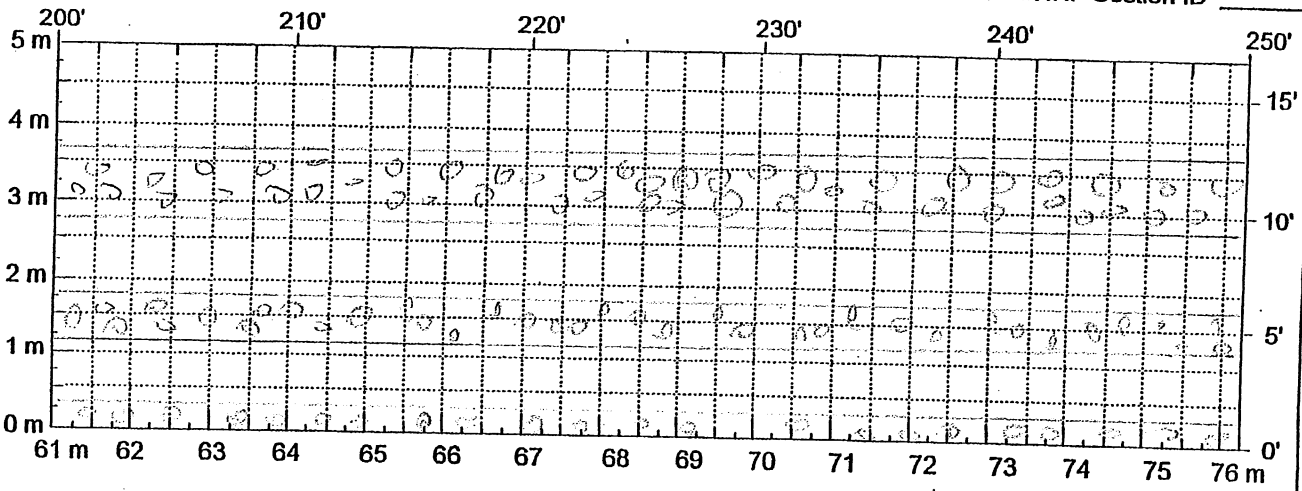
Reviewer: _____ Surveyors: WT/SK

Date: _____ Date: 4/15/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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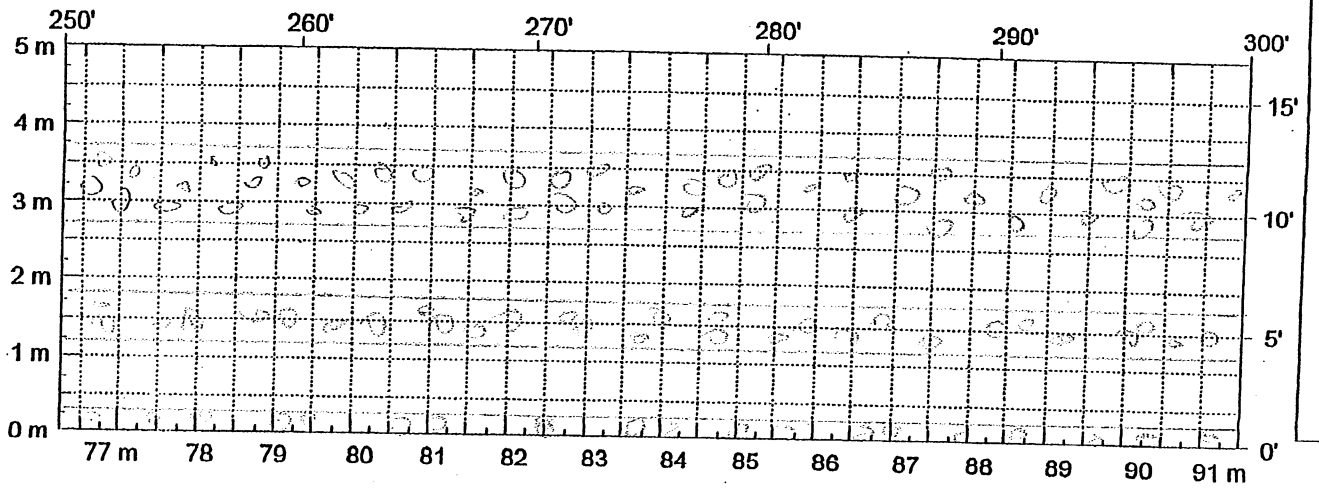
Comments: _____



Comments: _____

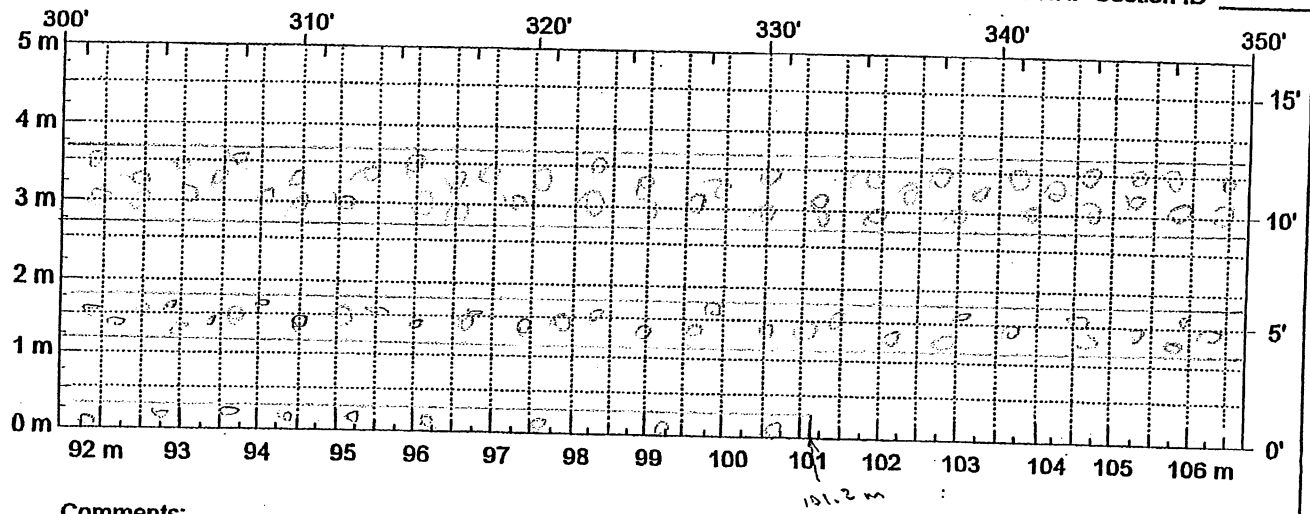
Reviewer: _____ Surveyors: WT/BK

Date: _____ Date: 4/15/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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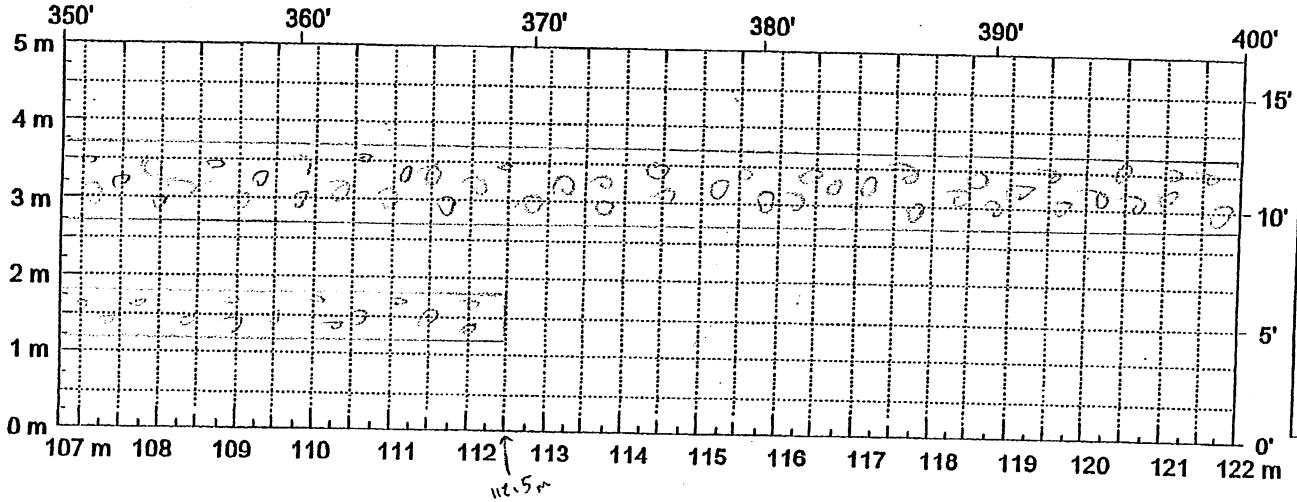


Comments: _____

Sheet Summary

Reviewer: _____ Surveyors: WM/BK

Date: _____ Date: 4/15/02

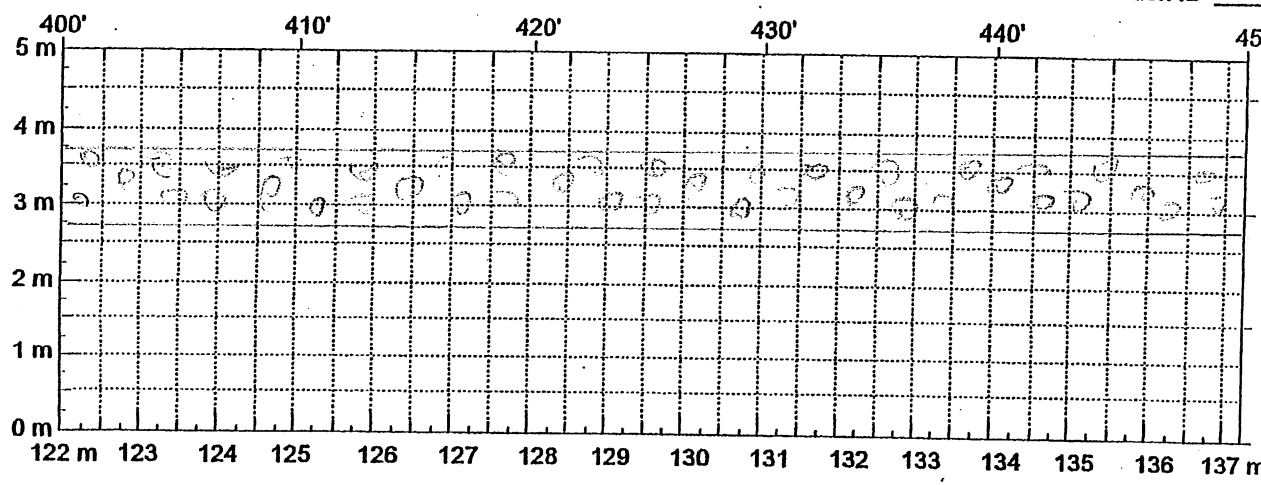
Pavement Temp:

After_____

State Assigned ID _____

State Code _____

SHRP Section ID _____



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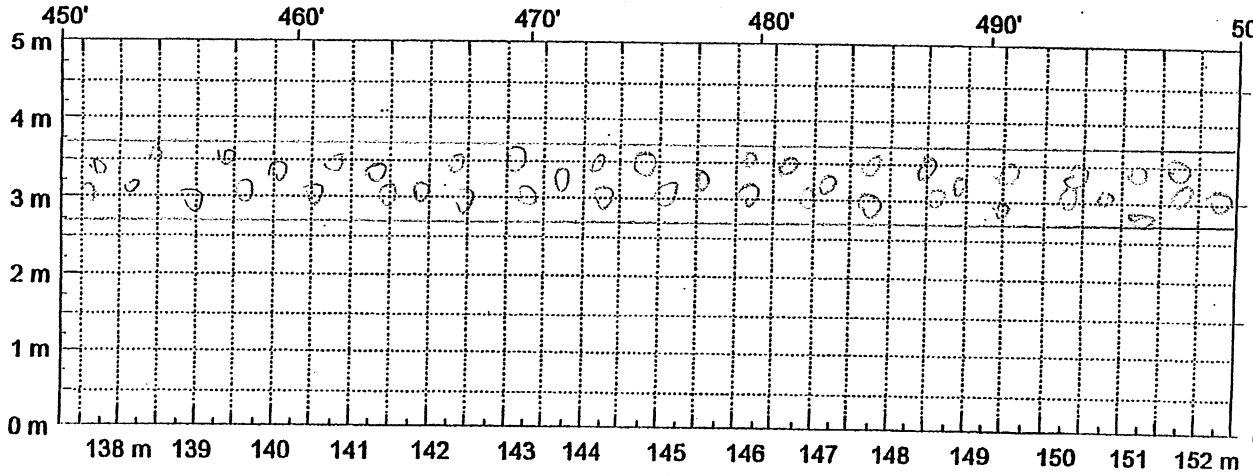


Comments: _____

Sheet Summary

Montana Performance Prediction Models Contract
Field Data Report

Location: Silver City
Longitude: 112°11' W
Lattitude: 46°45' N

FWD Data

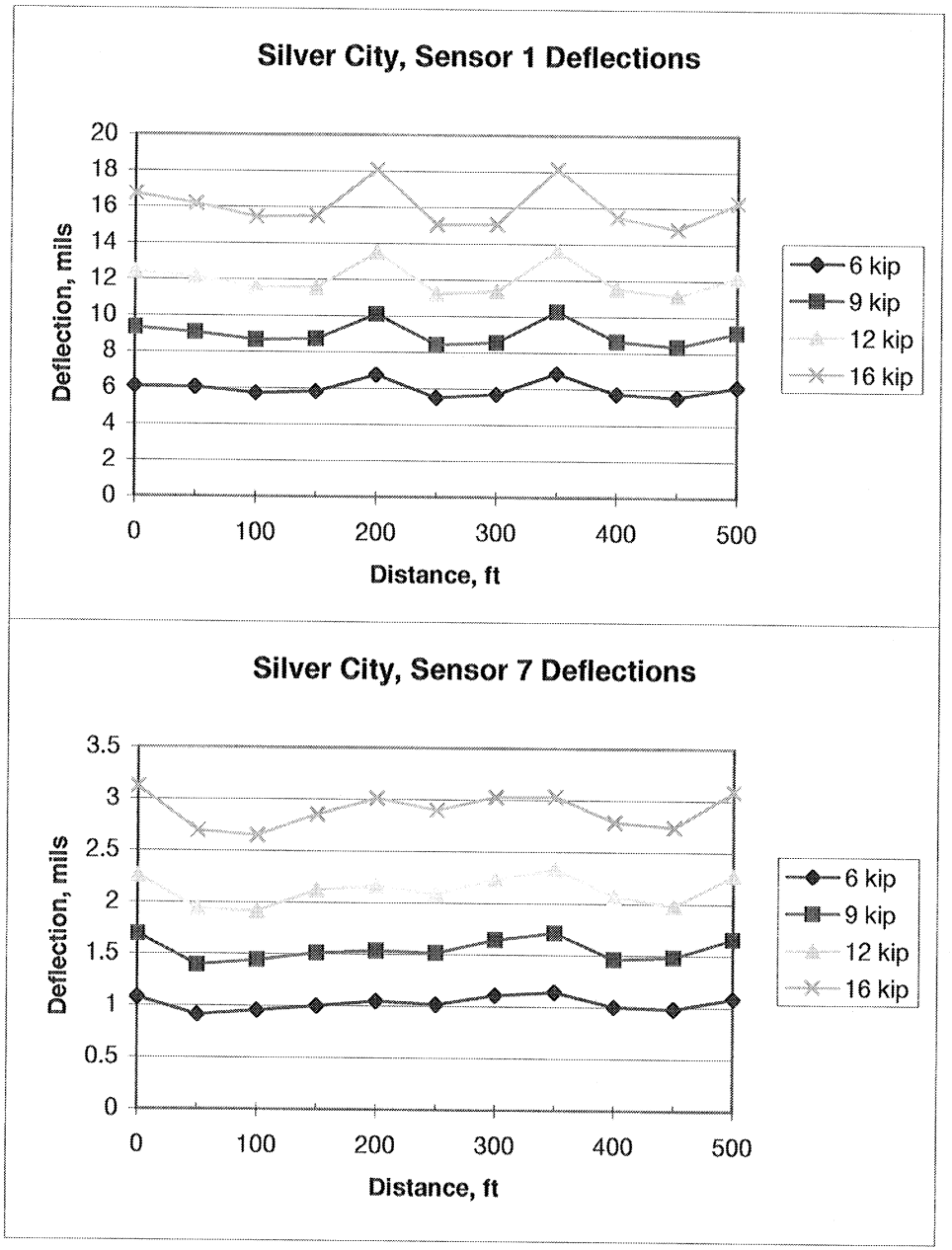
Test Date: 10/7/01

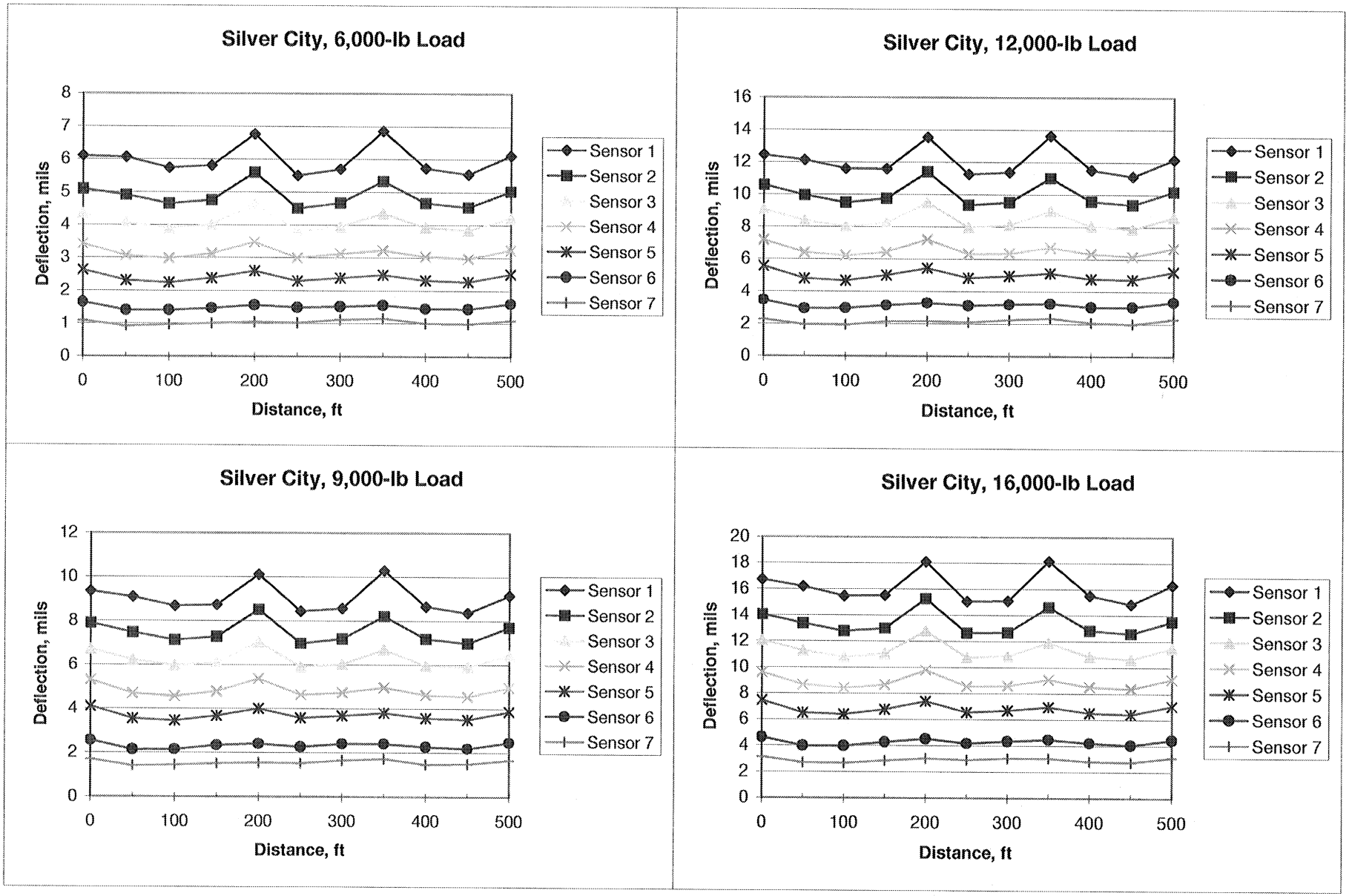
Layer	Material Type	Average Thickness in.
1	ACP	4.9
2	Base	7.0
3	Subgrade	-

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.16	7.27	6.07	5.19	4.07	3.13	1.96	1.29
0+00	9.63	9.98	8.44	7.19	5.66	4.39	2.73	1.81
0+00	12.07	12.50	10.63	9.12	7.20	5.59	3.48	2.27
0+00	15.49	16.19	13.59	11.68	9.29	7.22	4.48	3.02
0+50	7.02	7.08	5.74	4.76	3.59	2.70	1.64	1.07
0+50	9.61	9.69	7.96	6.64	5.01	3.78	2.28	1.49
0+50	12.00	12.12	9.95	8.37	6.39	4.80	2.93	1.94
0+50	15.40	15.57	12.86	10.84	8.32	6.25	3.83	2.59
1+00	6.96	6.64	5.39	4.50	3.46	2.60	1.62	1.11
1+00	9.54	9.18	7.54	6.32	4.84	3.65	2.27	1.53
1+00	11.96	11.54	9.45	7.98	6.19	4.65	2.95	1.91
1+00	15.34	14.81	12.23	10.34	8.07	6.12	3.80	2.54
1+50	6.95	6.72	5.51	4.64	3.62	2.76	1.70	1.16
1+50	9.65	9.35	7.79	6.56	5.12	3.94	2.50	1.62
1+50	11.88	11.45	9.66	8.14	6.36	4.95	3.10	2.10
1+50	15.36	14.89	12.47	10.61	8.30	6.49	4.09	2.74
2+00	6.98	7.86	6.50	5.39	4.04	3.02	1.81	1.22
2+00	9.55	10.71	9.02	7.46	5.69	4.24	2.55	1.63
2+00	11.91	13.42	11.30	9.44	7.14	5.40	3.26	2.14
2+00	15.41	17.41	14.69	12.32	9.41	7.13	4.34	2.90
2+50	6.95	6.37	5.21	4.42	3.48	2.66	1.72	1.18
2+50	9.50	8.89	7.35	6.24	4.89	3.77	2.38	1.60
2+50	12.08	11.33	9.41	8.00	6.35	4.87	3.14	2.10
2+50	15.45	14.53	12.20	10.38	8.24	6.32	4.03	2.80

Station	Load	Deflection 1	Deflection 2	Deflection 3	Deflection 4	Deflection 5	Deflection 6	Deflection 7
ft	kips	mils	mils	mils	mils	mils	mils	mils
3+00	6.96	6.60	5.41	4.58	3.62	2.77	1.76	1.29
3+00	9.53	9.06	7.59	6.37	5.00	3.89	2.54	1.74
3+00	12.07	11.43	9.57	8.16	6.39	4.98	3.21	2.24
3+00	15.42	14.54	12.21	10.47	8.28	6.44	4.17	2.92
3+50	6.97	7.96	6.19	5.06	3.75	2.88	1.81	1.33
3+50	9.50	10.85	8.66	7.06	5.24	4.01	2.53	1.81
3+50	12.00	13.61	11.01	8.98	6.72	5.14	3.25	2.33
3+50	15.56	17.63	14.21	11.56	8.82	6.77	4.33	2.95
4+00	6.94	6.62	5.40	4.53	3.51	2.68	1.68	1.16
4+00	9.54	9.16	7.60	6.31	4.89	3.78	2.40	1.55
4+00	11.99	11.51	9.57	8.05	6.33	4.78	3.04	2.07
4+00	15.31	14.84	12.26	10.36	8.14	6.23	4.03	2.67
4+50	7.00	6.46	5.29	4.47	3.47	2.65	1.68	1.15
4+50	9.53	8.84	7.39	6.25	4.81	3.70	2.31	1.57
4+50	11.99	11.11	9.36	7.86	6.17	4.73	3.04	1.98
4+50	15.41	14.28	12.12	10.21	8.05	6.17	3.90	2.64
5+00	6.95	7.08	5.82	4.88	3.75	2.91	1.86	1.26
5+00	9.60	9.75	8.21	6.86	5.28	4.12	2.63	1.77
5+00	11.93	12.08	10.12	8.55	6.64	5.19	3.32	2.26
5+00	15.30	15.57	12.92	10.98	8.68	6.72	4.24	2.95

FWD Deflections




Silver City, 6,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7
Silver City, 12,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7
Silver City, 9,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7
Silver City, 16,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7

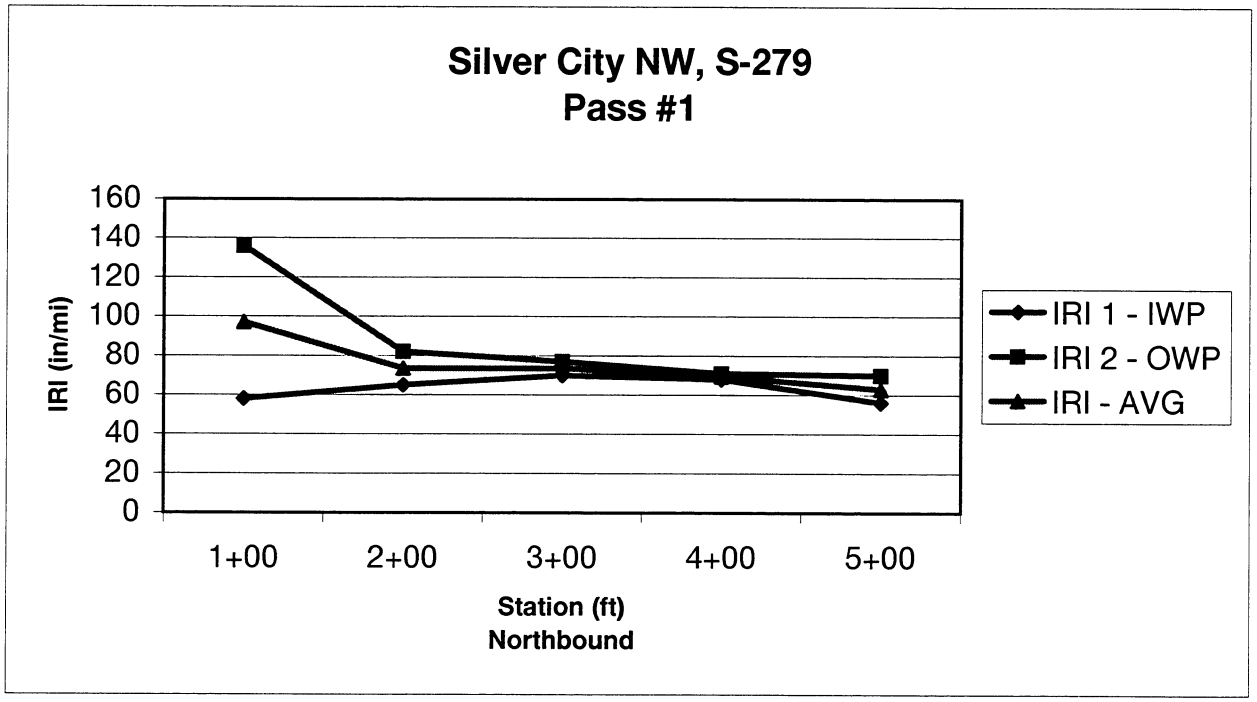
Montana Performance Prediction Models Contract
Field Data Report

Location: Silver City
Longitude: 112°11' W
Lattitude: 46°45' N

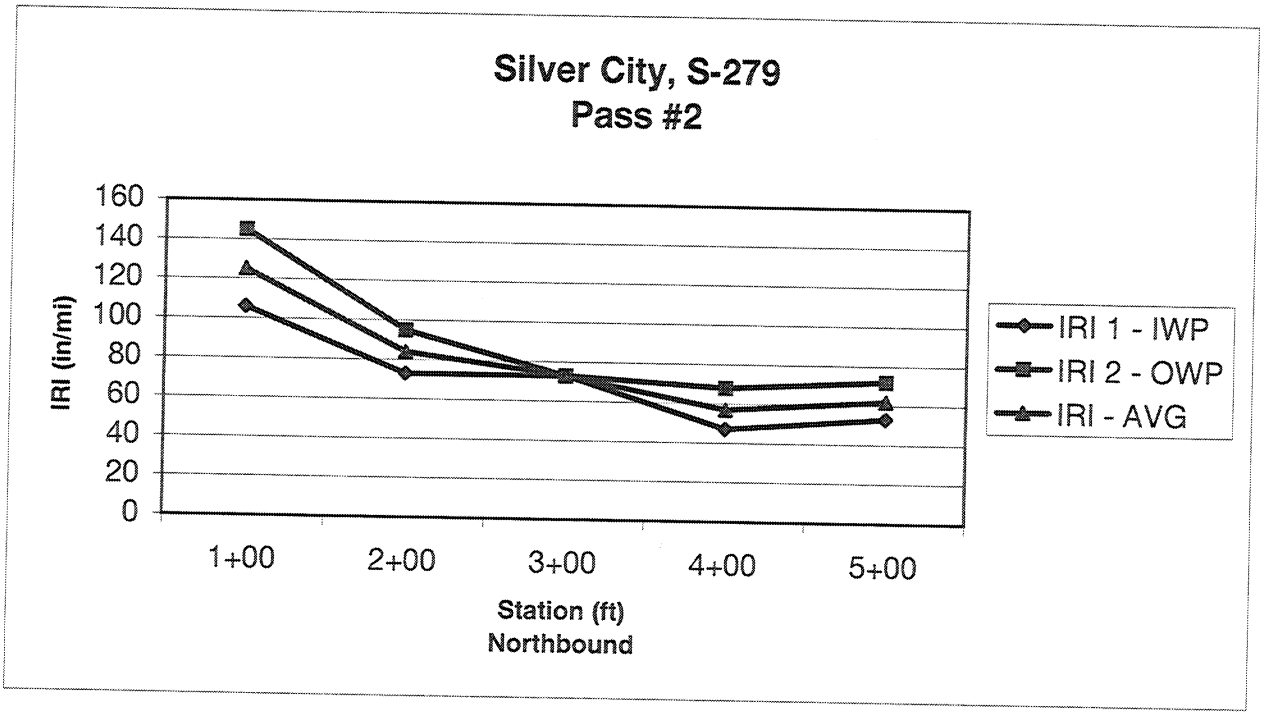
Profile Data

Test Date: 10/16/01

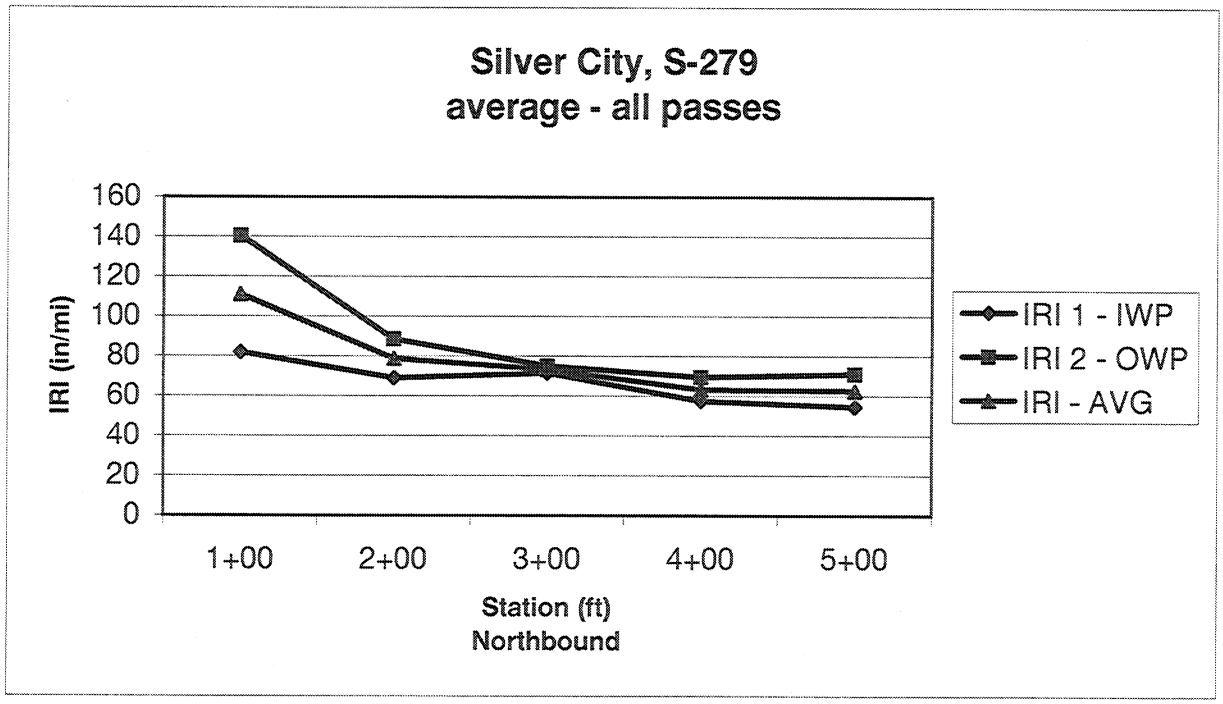
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.16	0.034	58	136	97
2+00	100	200	100	0.15	0.034	65	82	74
3+00	200	300	100	0.16	0.030	70	77	74
4+00	300	400	100	0.15	0.033	68	71	70
5+00	400	500	100	0.16	0.035	56	70	63
AVG.				0.156	0.0332	63.4	87.2	75.3
STD.				0.005	0.002	6.148	27.707	12.868



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.15	0.039	106	145	125
2+00	100	200	100	0.15	0.047	73	95	84
3+00	200	300	100	0.17	0.031	73	73	73
4+00	300	400	100	0.16	0.029	47	68	57
5+00	400	500	100	0.16	0.033	53	72	62
AVG.				0.158	0.036	70.4	90.6	80.2
STD.				0.008	0.007	23.082	32.192	27.124



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.16	0.037	82	140.5	111
2+00	100	200	100	0.15	0.041	69	88.5	78.75
3+00	200	300	100	0.17	0.031	71.5	75	73.25
4+00	300	400	100	0.16	0.031	57.5	69.5	63.25
5+00	400	500	100	0.16	0.034	54.5	71	62.5
AVG.				0.157	0.035	66.9	88.9	77.8
STD.				0.006	0.004	11.132	29.802	19.809



APPENDIX B

BECKHILL/DEERLODGE

Montana Performance Prediction Models Contract
Field Data Report

Location: Beckhill / Deerlodge
Longitude: 112°43' W
Lattitude: 46°28' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	3.9	4.7	4.3	Chip Seal
2	Pulverized	7.2	9.0	8.1	
3	Existing Base	31.7	34.5	33.1	Dark Brown Sandy Gravel
4	Subgrade	-	-	-	Brown-Gray Clayey Gravel

Materials Sampling

Date: 4/16/02

Material Type	Quantity	Comments
ACP	14 cores	2-10" & 12-6" cores
Base	4 bags	
Subgrade	7 bags	1 with 50 blows

SHRP REGION _____ STATE CODE _____

STATE MT

FIELD MATERIAL SAMPLING AND FIELD TESTING

SHRP ASSIGNED ID _____

LTPP EXPERIMENT Beck Hill (W) ROUTE/HIGHWAY I-90 Lane RT (outer) Direction East

SAMPLE/TEST: (a) Before Section V#1 (b) After Section _____ FIELD SET NO. _____

4.3" Asphalt

LOG OF SHOULDER PROBE

DCG SHEET: 08

OPERATOR Dan M. EQUIPMENT USED _____ SHEET NUMBER 1 OF 1

AUGERING DATE 4 - 16 - 02 LOCATION STATION: RP181 (W. End) AUGER PROBE NUMBER 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

PMS 11

Scale (feet)	Depth from ~~Surface~~ Base of PMS (Feet)	Material Description	Material Code
1	.6	Recycled Asphalt	OLD RECYCLED PMS
2	2.5 Below PMS Base	Dk brn sandy gravel Base Course	A-1 (Below PMS Base) .6 - 1.0 Sample 1.0 - 1.5 Sample
3	3.6	Brn gravelly sand Subgrade	2.5' Below Base of PMS - SPLIT SPOON BLOW COUNT =50 ~ 6.5" Total
4	4.6	grg brn clayey gravel (river pebbles & cobbles) (plastic clay)	4.0' FROM SURFACE Unsuccessful Shelby Tube
5	7.6	dk grg sandy Highly plast cly	4.0 ~ 5.0 Sample 5.0 ~ 6.0 Sample
6			
7			
8			
9			
10			
11			
12			
13			
14	12.9	grg - dk grg Highly plast cly w/some sand	
15			
16	15.6	gravel no sample at surface	
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED
G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
_____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

SHRP-LTPP

SHRP REGION _____ **FIELD MATERIAL SAMPLING** **STATE CODE** _____

STATE MT **AND FIELD TESTING** **SHRP ASSIGNED ID** _____

LTPP EXPERIMENT Beck Hill CE) ROUTE/HIGHWAY I-90 Lane Rt (outer) Direction East

SAMPLE/TEST: (a) Before Section _____ (b) After Section V #2 **FIELD SET NO.** _____

LOG OF SHOULDER PROBE **DCG SHEET: 08**

OPERATOR Don M. EQUIPMENT USED _____ SHEET NUMBER 1 OF 1

AUGERING DATE 4-16-02 *LOCATION STATION:* East End *AUGER PROBE NUMBER* _____

TOP OF ROCK BASED ON: _____ *OFFSET:* _____ *feet from °/s*

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	5" PMS	Plant Mix Surfacing	
2	14" Pulverized		
3	35"	dk brn sandy gravel aggregate base	6-1' of Base SAMPLES 1-1.5' of Base
4	4.0'		35" split spoon sample 30 blowcount 3' TO 4.5'
5		Thin org sandy clay ~5.0"	
6	5.7'	brn-grybrn sandy clayey gravel Subgrade	Sample - 0-9" Subgrade
7	Slow Drilling	coarse gravel some clay	
8			Sample Subgrade 9"-21"
9		brn gravelly clay .5'	
10		dk gry sandy clay	
11		Highly plastic → Farmis balls	
12			
13	12.5'		
14		Lt gry wet Highly plastic clay w/some coarse sand	
15	15.0		
16	16.0	Coarse gravel	
17	16.5	gry clay	
18		Coarse gravels and interbedded plastic clays w/some sand	
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N *DEPTH TO REFUSAL:* _____ *(FEET)*

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
_____-_____-19__
Date

Project No._____ Control No. 08021

Project Name RESEARCH PROJ Sta.: BECK HILL

Core Log. No. CL-3-15-02 Hole No. - 1

Driller MAYBERRY Crew SAM JOHN Geotech GREG & WILLIAM

Date 4/16/02 Drill SIMCO Shelbys_____ # Bag Samples_____

Drilling Method - Augers 8" Casing_____/Size_____/Bit FBR

Elev._____ Water Level_____ Pipe Installed_____

==========

Comments:

==========

0.0-- ASPHALT 0.6	SPT/SHELBYS	PSI	RATE
GRAVEL BR.	0.6 - 1.0	BAG SAMA	
SANDY GRAVEL	3.0 - 4.5	SS	
S.S - CLAYEE	6.0	BAG SAMA	
SAND GREY	DRILLED TO		
W/S GRAVEL		20'	
20.0		NO	SAMP
BOH			

Project No. _____ Control No. 8821

Project Name RESEARCH Proj Sta.: BECK Hill

Core Log. No. CL-3-16-02 Hole No. 2

Driller MAYBERRY Crew JOHN SAM Geotech GREG & WING OW

Date 4/16/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FGR

Elev. _____ Water Level _____ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 0.6	SPT/SHELBYS	PSI	RATE
GRAVEL BR SANDY	2.0 BAG	SAMPLE	
GRAVEL W/S COBBLES	2.5 BAG	SAMPLE	
8.5 CLAYEE BR	3.0-4.5	SS	
SANDY GRAVEL	4.7 BAG	SAMPLE	
20.0	5.7 BAG	SAMPLE	
BOH.	DRILLED	TO 20'	
	NO SAMPLES		

Montana Performance Prediction Models Contract
Field Data Report

Location: Beckhill / Deerlodge
Longitude: 112°43' W
Lattitude: 46°28' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/16/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	0	0	0
	Length (Meters)	0.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Beckhill / Deerlodge
Longitude: 112°43' W
Lattitude: 46°28' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/16/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL
		N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING	
	(Number)	0
	(Square Meters)	0.0
SURFACE DEFECTS		
11	BLEEDING	
	(Square Meters)	0.0
12	POLISHED AGGREGATE	
	(Square Meters)	0.0
13	RAVELING	
	(Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING	
	(Number)	0
	Length of Affected Pavement (Meters)	0.0
16	OTHER (Describe)	Snow plough damage from 225 ft to 250 ft on outer wheelpath

Deerlodge

Reviewer: _____ Surveyors: WJT / BK

Date: _____ Date: 4/15/02

Pavement Temp:

Before_____ After_____

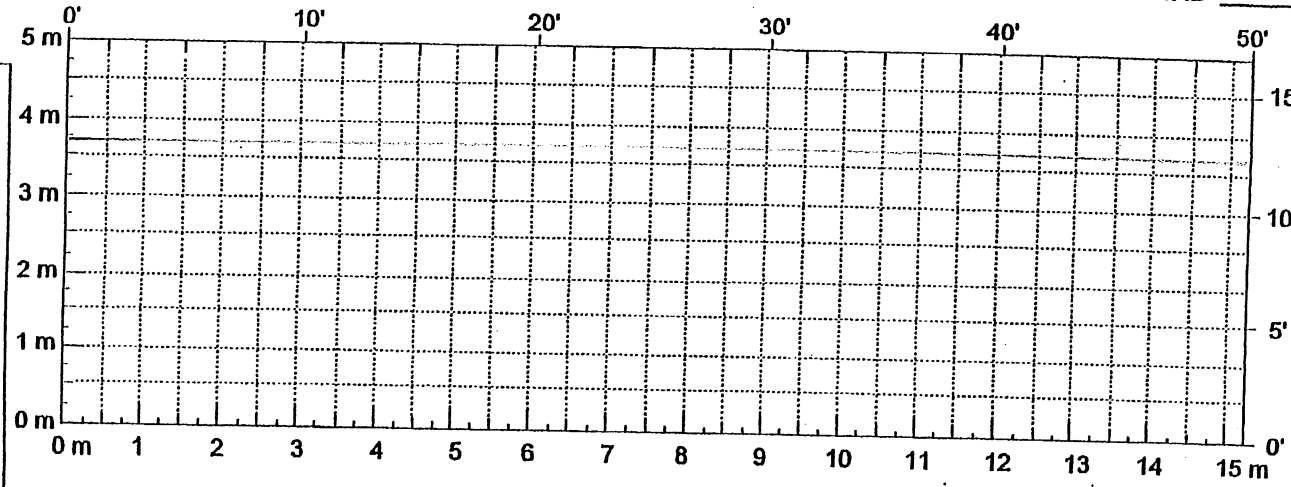
State Assigned ID _____

State Code _____

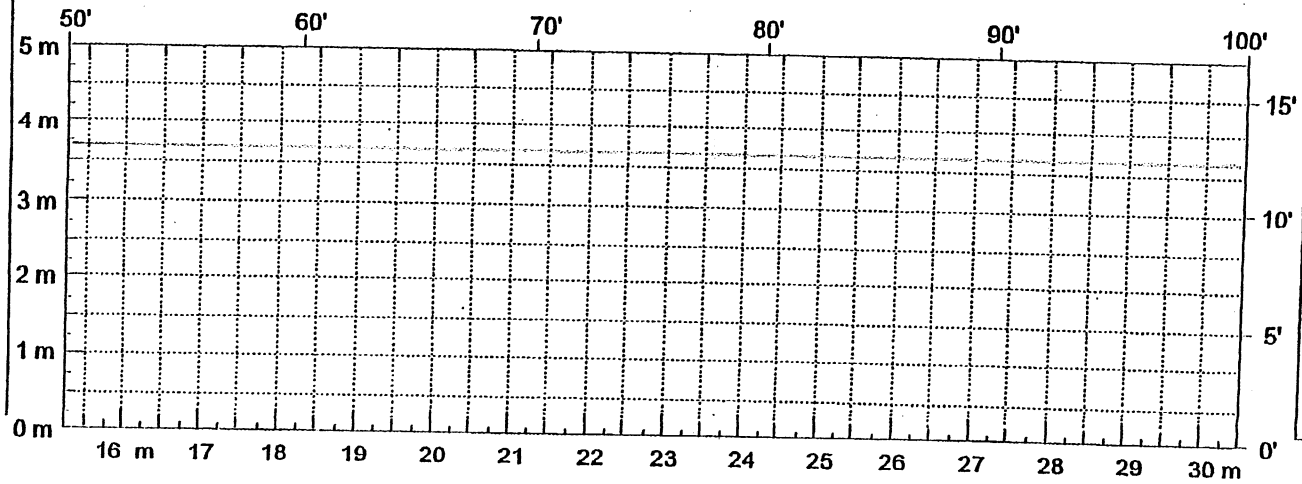
SHRP Section ID _____

Section Summary

—NONE—



Comments: _____



Comments: _____

Sheet Summary

NONE

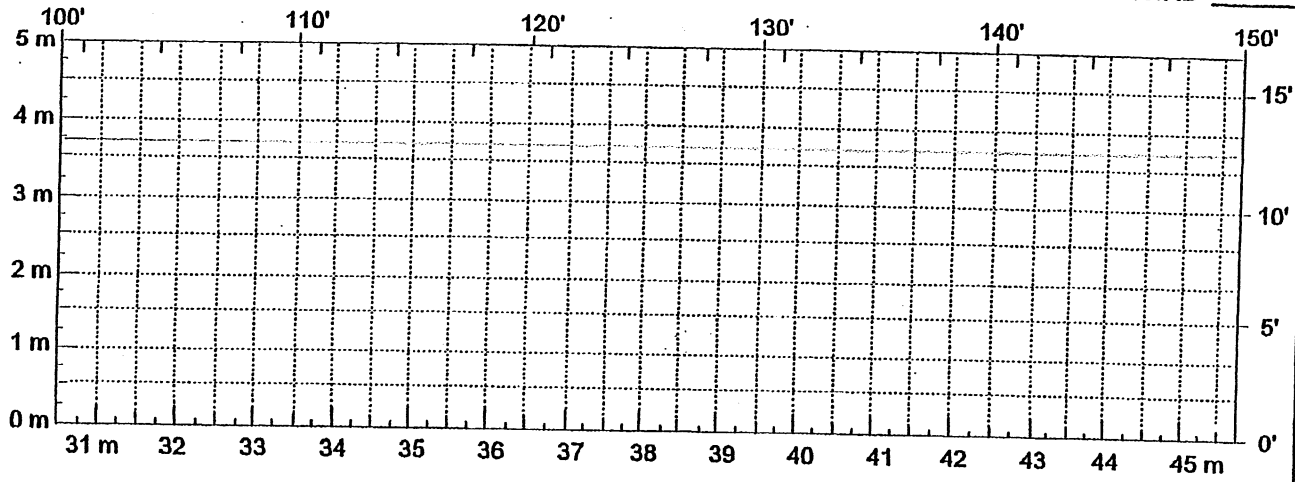
Reviewer: _____ Surveyors: WJT / BK

Date: _____ Date: 4/16/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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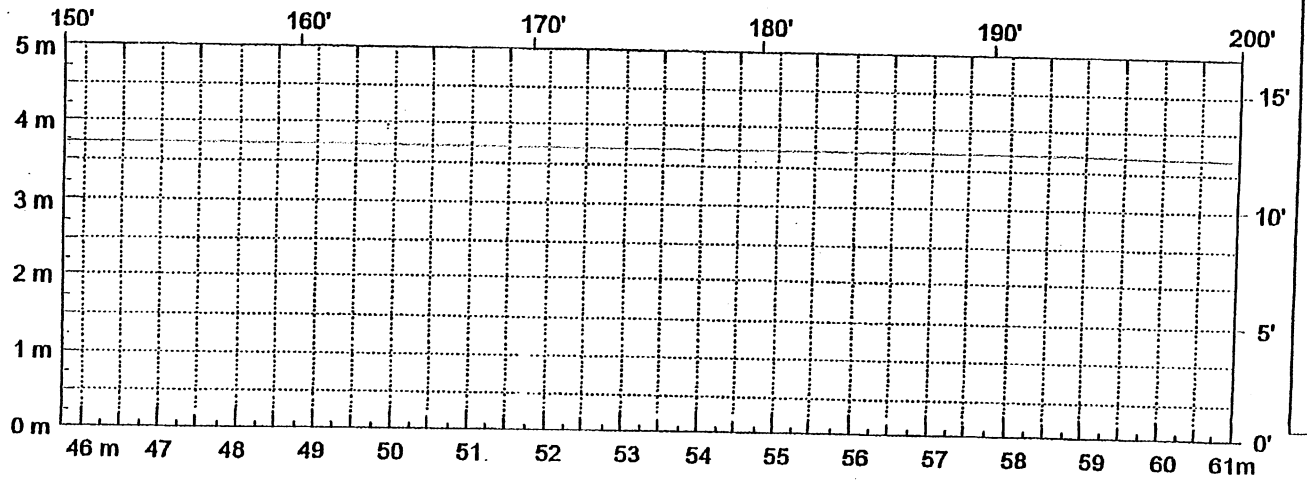


Comments: _____

Sheet Summary

NONE

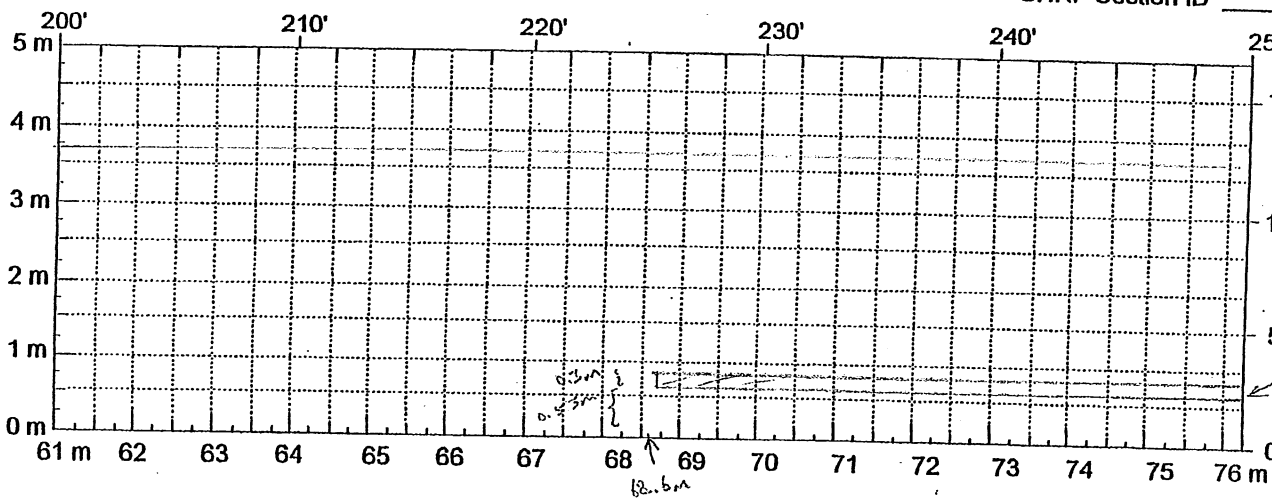
Reviewer: _____ Surveyors: WT/BK

Date: _____ Date: 4/16/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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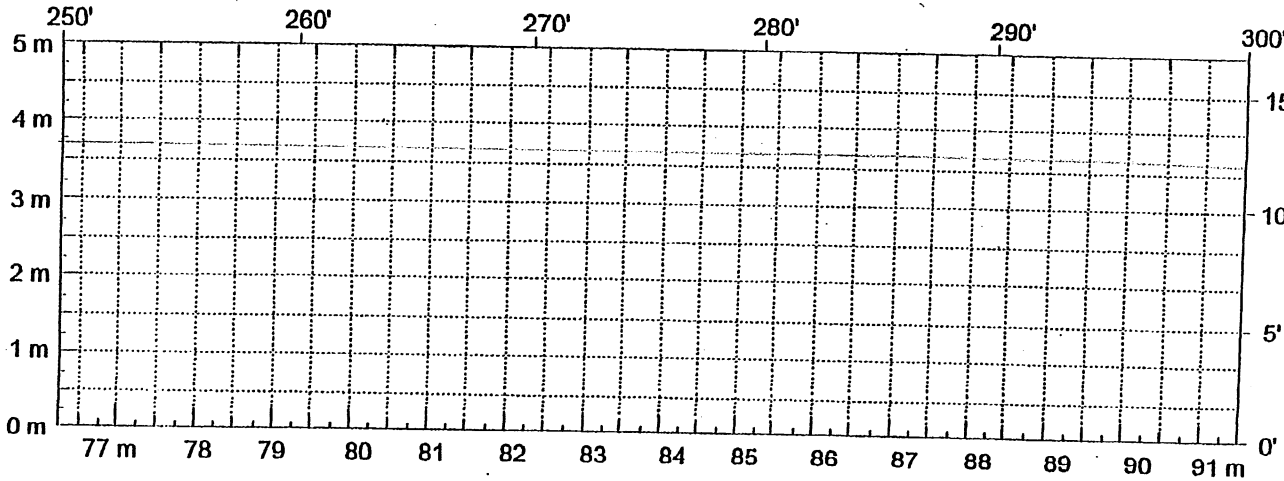


Comments: _____

Sheet Summary

Snow plough damage OKAC

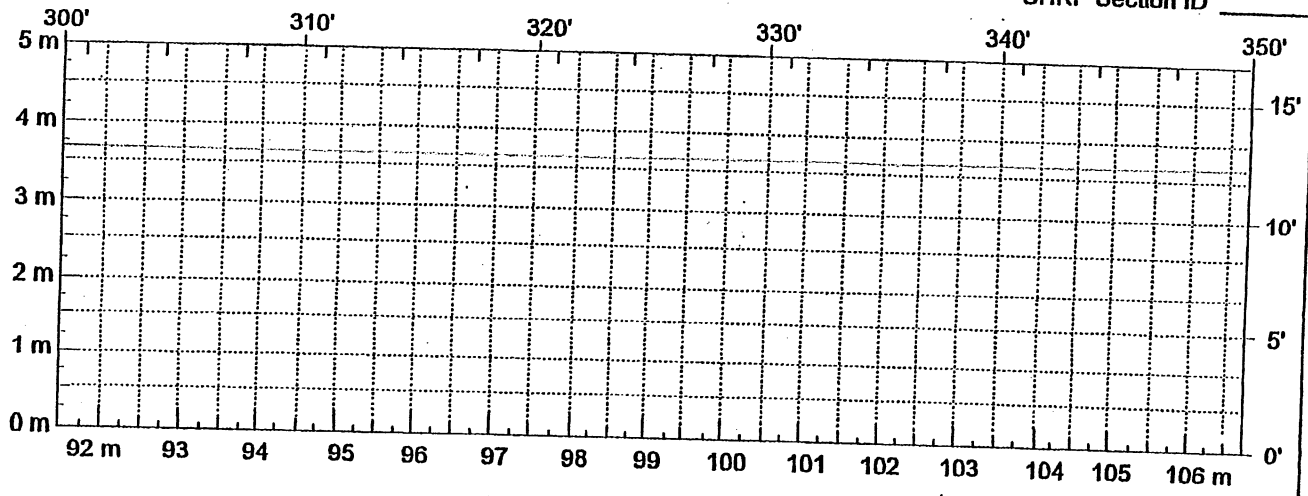
Reviewer: _____ Surveyors: WT/BK

Date: _____ Date: 4/15/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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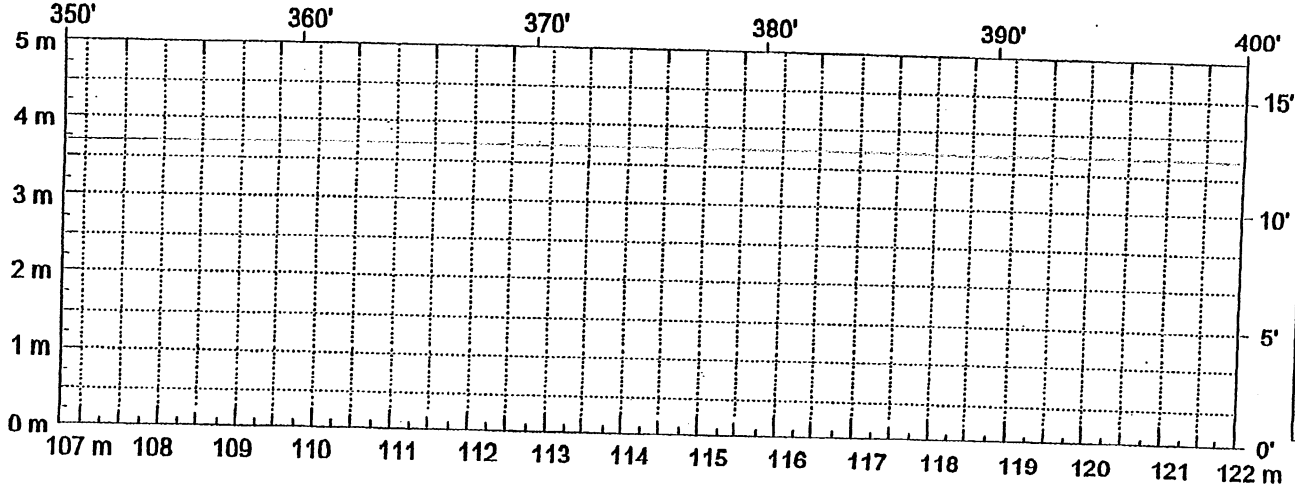


Comments: _____

Sheet Summary

NONE

Reviewer: _____ Surveyors: UST/BK

Date: _____ Date: 4/16/02

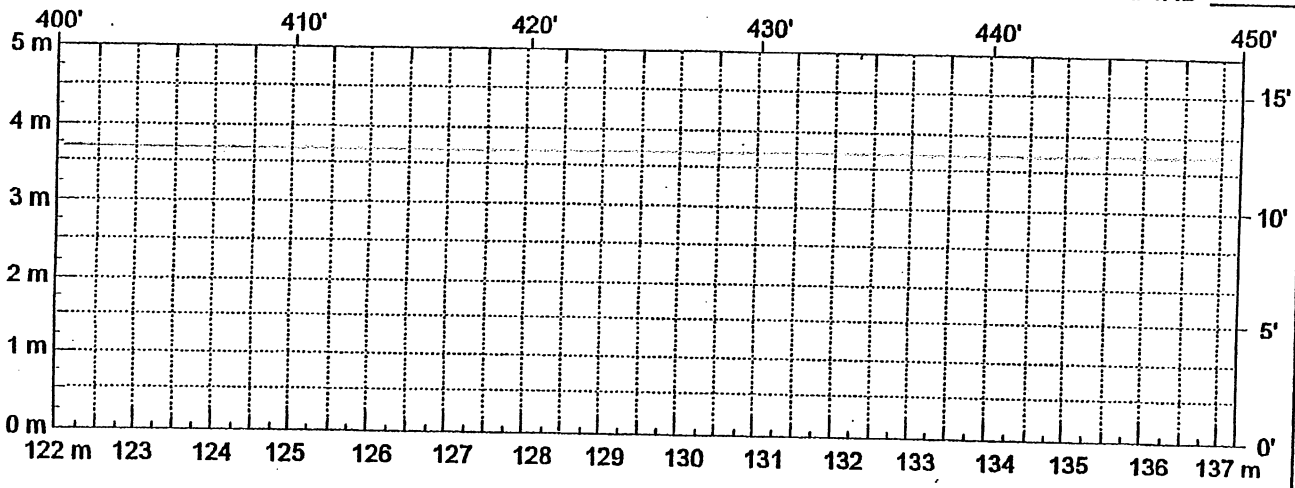
Pavement Temp:

After _____

State Assigned ID _____

State Code _____

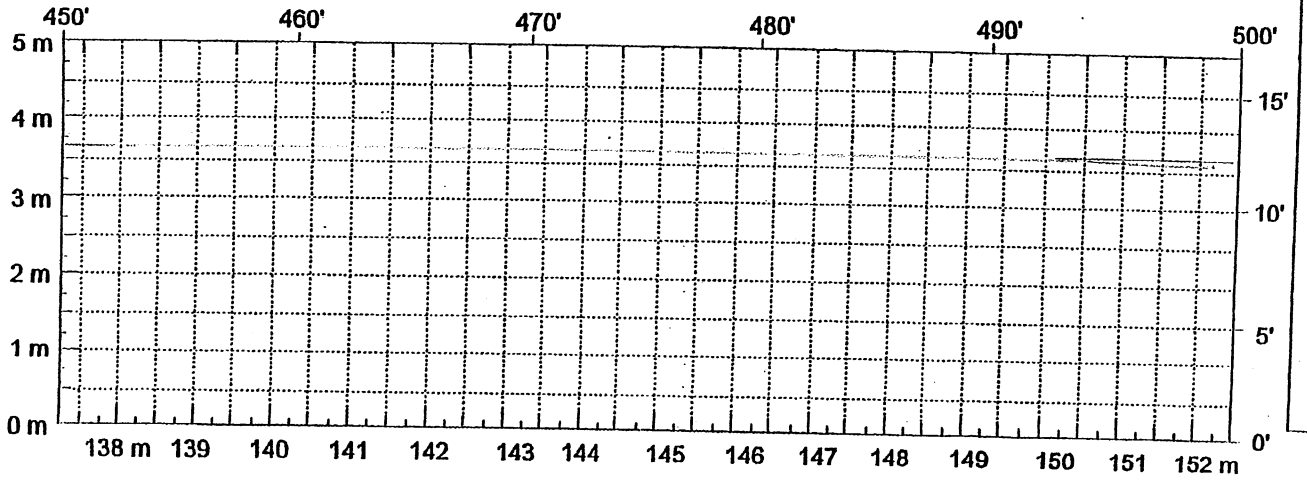
SHRP Section ID _____



Sheet Summary

NONE

Comments: _____



Comments: _____

Montana Performance Prediction Models Contract
Field Data Report

Location: Beckhill / Deerlodge
Longitude: 112°43' W
Lattitude: 46°28' N

FWD Data

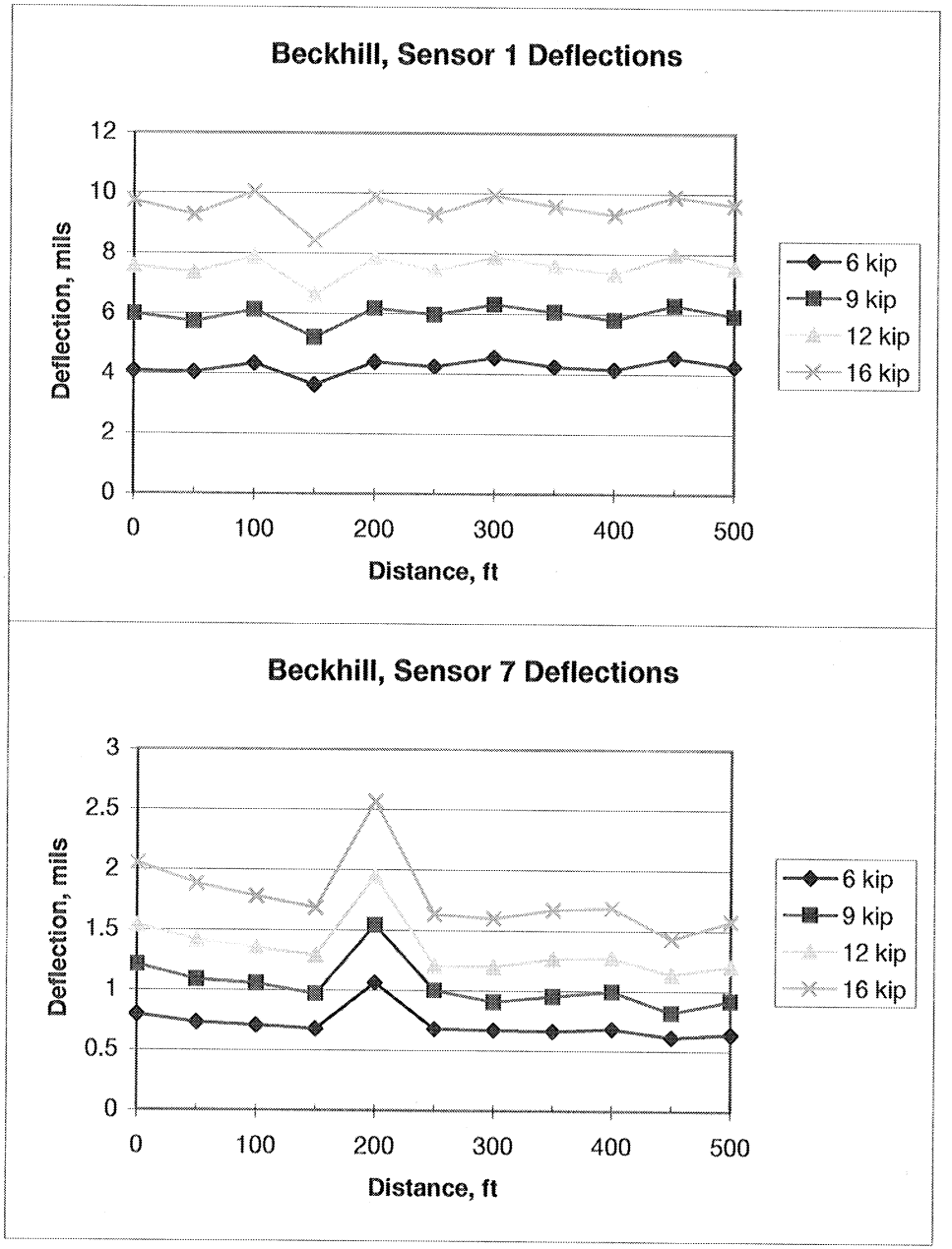
Test Date: 10/8/01

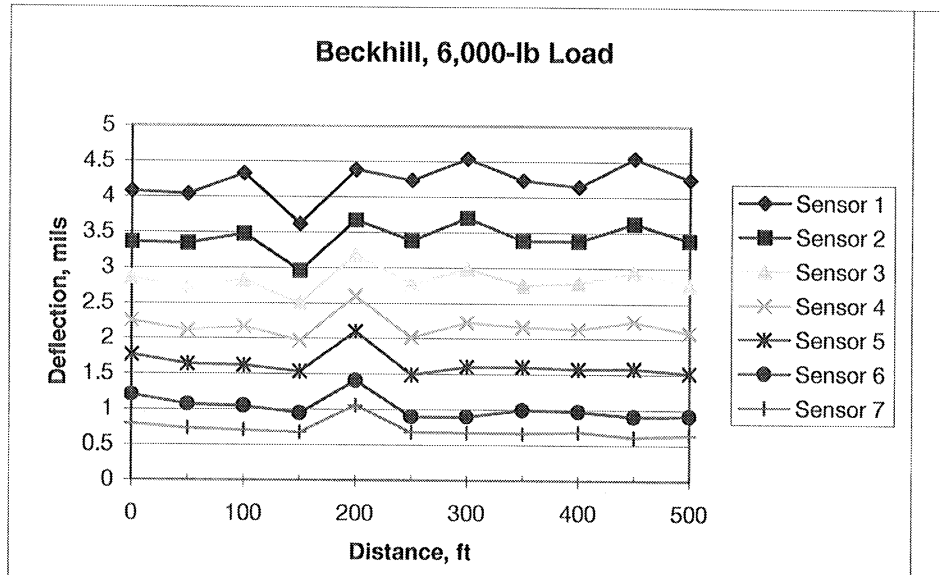
Layer	Material Type	Average Thickness in.
1	ACP	4.3
2	Pulverized	8.1
3	Existing Base	33.1
4	Subgrade	-

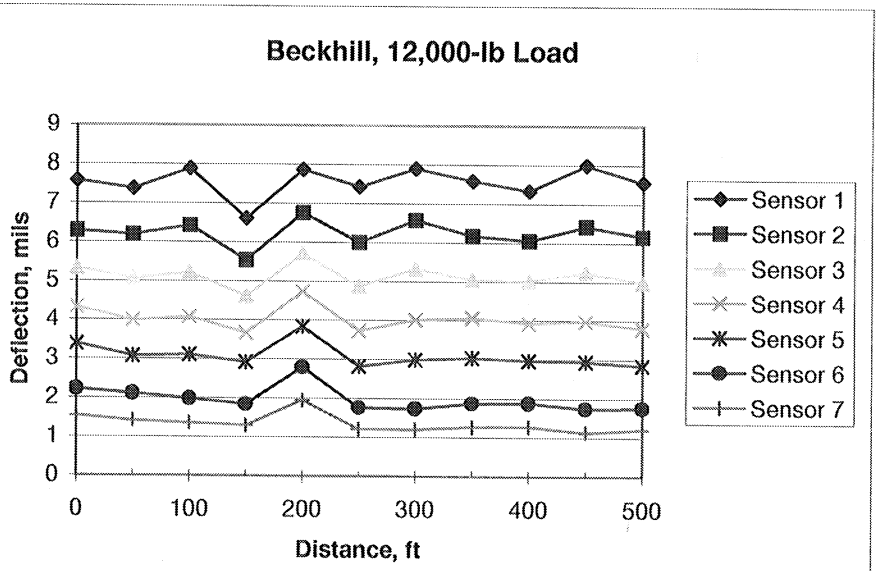
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.02	4.77	3.93	3.35	2.63	2.07	1.41	0.93
0+00	9.83	6.53	5.43	4.69	3.62	2.88	1.86	1.32
0+00	12.49	7.88	6.54	5.54	4.50	3.52	2.31	1.60
0+00	15.51	9.44	7.77	7.31	5.35	4.23	2.78	1.99
0+50	6.90	4.64	3.84	3.13	2.43	1.88	1.23	0.84
0+50	9.79	6.23	5.25	4.24	3.26	2.61	1.76	1.18
0+50	12.40	7.61	6.39	5.24	4.12	3.17	2.18	1.46
0+50	15.55	9.02	7.54	6.26	4.90	3.79	2.48	1.83
1+00	6.89	4.97	3.99	3.25	2.49	1.86	1.20	0.81
1+00	9.81	6.66	5.49	4.48	3.39	2.59	1.64	1.15
1+00	12.24	8.04	6.55	5.32	4.16	3.16	2.02	1.38
1+00	15.55	9.77	7.92	6.48	4.96	3.81	2.48	1.73
1+50	6.92	4.17	3.41	2.88	2.27	1.77	1.09	0.78
1+50	9.76	5.64	4.68	3.84	3.16	2.43	1.60	1.05
1+50	12.29	6.76	5.67	4.72	3.75	2.98	1.88	1.32
1+50	15.57	8.20	6.81	5.70	4.64	3.58	2.34	1.64
2+00	6.90	5.04	4.22	3.66	2.99	2.41	1.62	1.22
2+00	9.81	6.73	5.83	4.93	3.96	3.30	2.27	1.68
2+00	12.38	8.11	6.97	5.88	4.88	3.95	2.88	2.01
2+00	15.57	9.61	8.29	7.03	5.82	4.79	3.39	2.50
2+50	6.90	4.87	3.89	3.19	2.31	1.71	1.03	0.78
2+50	9.82	6.51	5.29	4.30	3.24	2.38	1.49	1.09
2+50	12.38	7.66	6.19	5.03	3.84	2.90	1.81	1.24
2+50	15.62	9.07	7.41	6.00	4.65	3.48	2.19	1.59

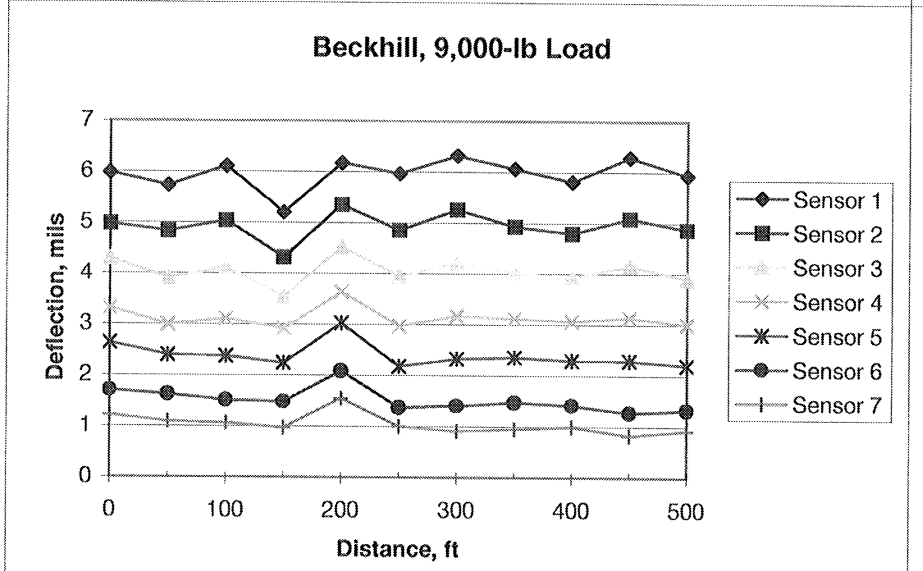
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	6.89	5.21	4.25	3.43	2.56	1.84	1.03	0.77
3+00	9.85	6.91	5.75	4.60	3.46	2.55	1.53	0.99
3+00	12.26	8.06	6.71	5.44	4.10	3.05	1.77	1.22
3+00	15.53	9.64	8.04	6.48	4.87	3.66	2.29	1.55
3+50	6.90	4.87	3.89	3.17	2.49	1.84	1.14	0.76
3+50	9.75	6.56	5.33	4.34	3.38	2.56	1.59	1.03
3+50	12.27	7.75	6.31	5.16	4.15	3.10	1.91	1.29
3+50	15.53	9.29	7.56	6.23	4.89	3.77	2.38	1.62
4+00	6.89	4.76	3.88	3.20	2.45	1.80	1.12	0.78
4+00	9.87	6.37	5.25	4.30	3.37	2.52	1.55	1.09
4+00	12.37	7.55	6.23	5.18	4.04	3.06	1.94	1.31
4+00	15.55	9.04	7.40	6.20	4.81	3.67	2.29	1.64
4+50	6.85	5.19	4.14	3.35	2.56	1.80	1.03	0.70
4+50	9.77	6.82	5.52	4.51	3.41	2.49	1.38	0.89
4+50	12.30	8.18	6.58	5.38	4.08	3.02	1.78	1.16
4+50	15.56	9.64	7.81	6.41	4.86	3.63	2.09	1.39
5+00	6.86	4.86	3.87	3.15	2.38	1.73	1.04	0.73
5+00	9.81	6.47	5.30	4.25	3.27	2.40	1.44	1.00
5+00	12.38	7.78	6.36	5.15	3.93	2.94	1.81	1.24
5+00	15.45	9.28	7.56	6.16	4.71	3.55	2.22	1.52

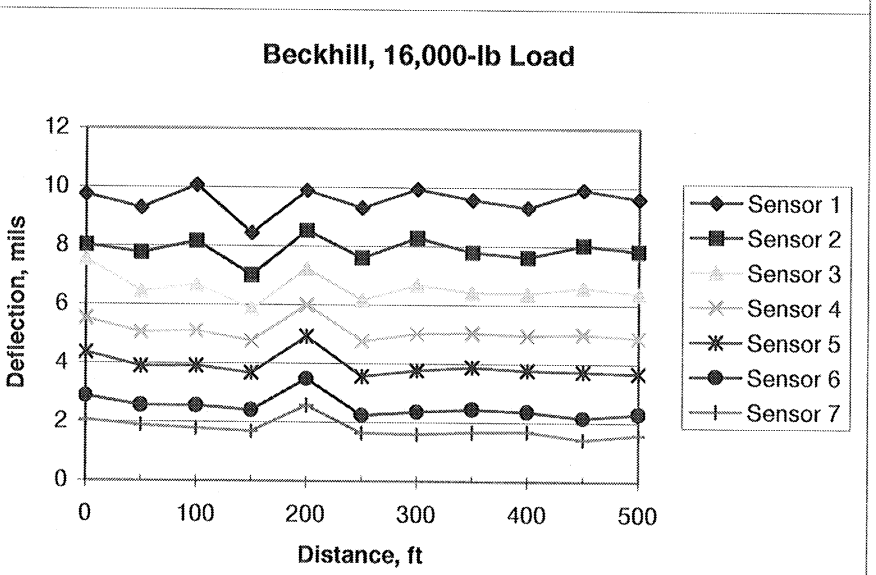
FWD Deflections




Beckhill, 6,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Beckhill, 12,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Beckhill, 9,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Beckhill, 16,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7

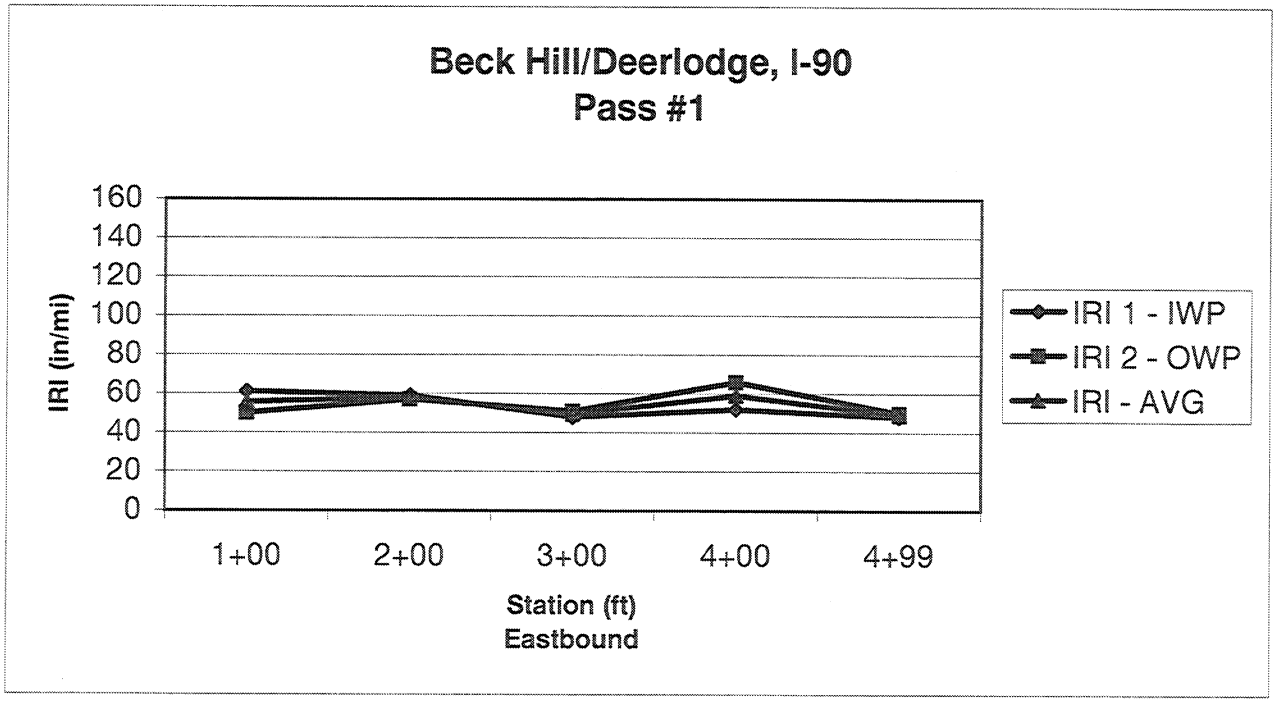
Montana Performance Prediction Models Contract
Field Data Report

Location: Beckhill / Deerlodge
Longitude: 112°43' W
Lattitude: 46°28' N

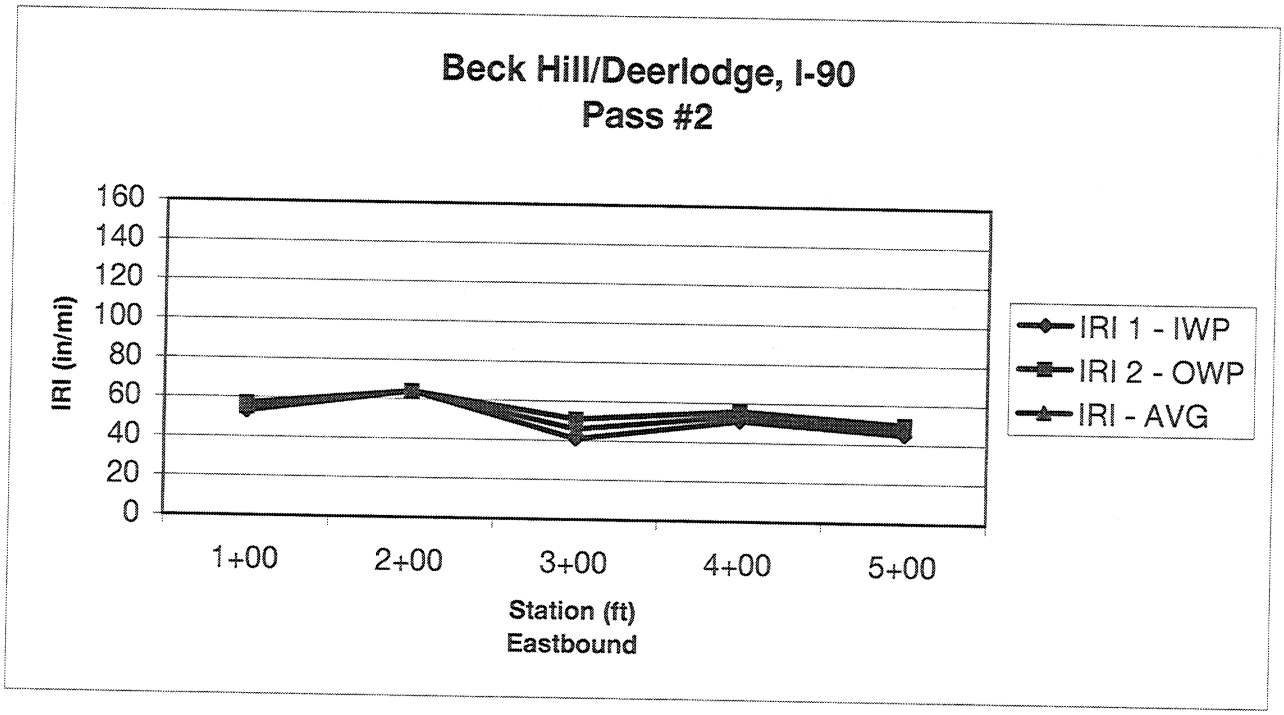
Profile Data

Test Date: 10/16/01

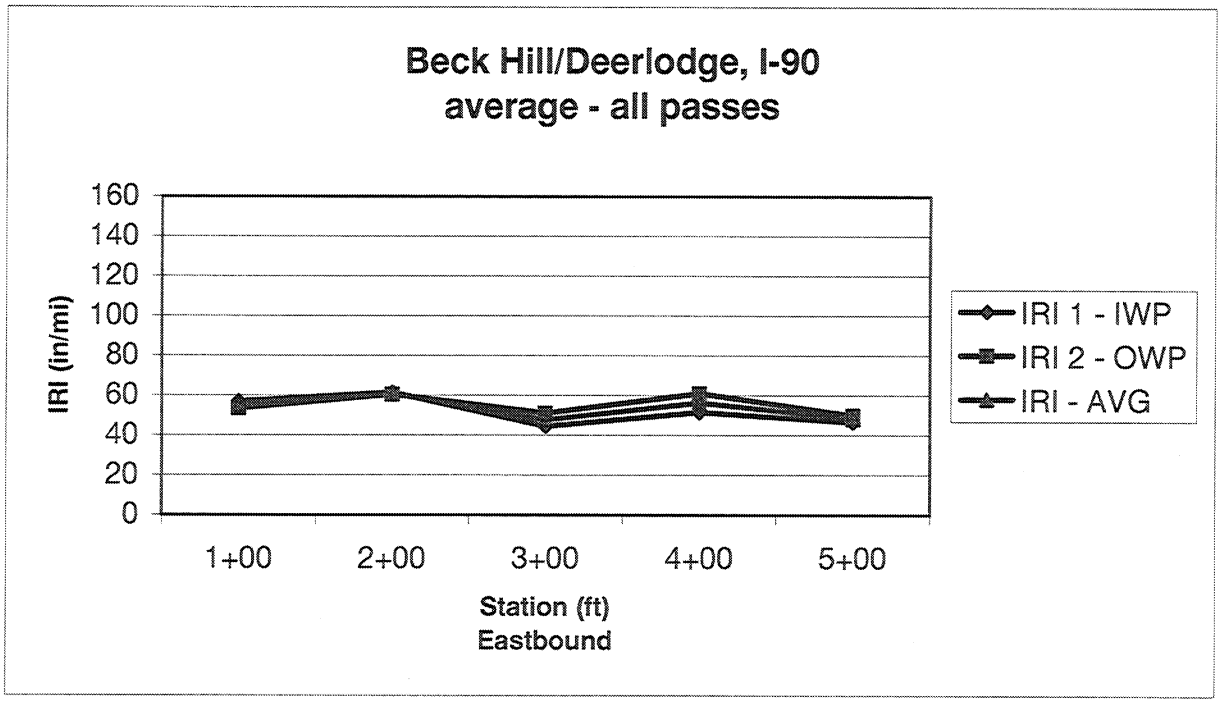
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.02	0.015	61	50	56
2+00	100	200	100	0.02	0.015	59	57	58
3+00	200	300	100	0.01	0.012	48	51	50
4+00	300	400	100	0.04	0.025	52	66	59
4+99	400	499	99	0.03	0.019	48	50	49
AVG.				0.024	0.017	53.6	54.8	54.2
STD.				0.011	0.005	6.107	6.907	4.698



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.05	0.029	53	57	55
2+00	100	200	100	0.04	0.023	64	64	64
3+00	200	300	100	0.01	0.012	41	51	46
4+00	300	400	100	0.04	0.024	51	56	54
5+00	400	500	100	0.04	0.021	45	50	48
AVG.				0.036	0.022	50.8	55.6	53.2
STD.				0.015	0.006	8.786	5.595	7.147



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.04	0.022	57	53.5	55.25
2+00	100	200	100	0.03	0.019	61.5	60.5	61
3+00	200	300	100	0.01	0.012	44.5	51	47.75
4+00	300	400	100	0.04	0.025	51.5	61	56.25
5+00	400	500	100	0.04	0.020	46.5	50	48.25
AVG.				0.030	0.020	52.2	55.2	53.7
STD.				0.012	0.005	7.103	5.227	5.641



APPENDIX C

PERMA

Montana Performance Prediction Models Contract
Field Data Report

Location:	Perma
Longitude:	114°36' W
Lattitude:	47°30' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	3.5	3.1	3.3	Chip Seal
2	CSB	3.8	4.5	4.1	
3	Base	6.0	6.0	6.0	No Information Recorded
4	Subgrade	-	-	-	Brown Sandy Clay with Fine Gravel

Materials Sampling

Date: 4/17/02

Material Type	Quantity	Comments
ACP / CSB	14 cores	2-10",10-6", 2-4" cores
Base	2 bags	1 aggr.base & 1 CTB
Subgrade	8 bags	1 TBD

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Perma AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V#1 (b) After Section _____ ROUTE/HIGHWAY S-382 Lane _____ Direction SB

FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4 - 17 - 02 LOCATION STATION: RP 9.75 (N. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	3.5" PAS		
	3 3/4" CTB		
2	6" BC	Base Course	
			Split Spoon 326 lows
3		brn - org brn plastic clay w/ fine gravel	1ST sample
4		Subgrade	Sample 2'-3'
5			
6	6'		Sample 3'-6' (x2)
7		Gny Cly	
8	8'	Highly plastic	
9		lt tan - pnk cly	
10		Highly plastic	
11		very stiff	
12			
13			
14			
	14.5'		
15		gry shale & gravel w/ tan cly	
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Perma ROUTE/HIGHWAY S-382 AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section _____ (b) After Section V P2 Lane _____ Direction SB

FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-17-02 LOCATION STATION: RP 9.75 (S. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	3.5" PMS		
2	4.5" CTB		
	6" Base Course	Exist. Base Course	Split spoon
3		Subgrade	23 blows
4		brn sandy cly w/ some fine gravel	sample 16"-14"
5			sample 14"-26"
6	6.5'		
7		Lt pnk-tan High plast. Stiff clay	Sample 4'-6'
8			
9			
10	10'		
11		gry shale & gravel w/ brn cly	
12			
13			
14	13.5		
15		brn plast. cly w/ gravel (wet)	
16			
17			
18	18.0		
19		brn sandy cly - sat./very wet	
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ____-____-19__
Date

Project No._____ Control No. 8021

Project Name RESEARCH PROJ Sta.: HOT SPRINGS

Core Log. No. CL-S-17-02 Hole No. 1

Driller MATBEARY Crew JOHN SAM Geotech WING OR & GREG

Date 4/17/02 Drill SIMCO Shelbys_____ # Bag Samples_____

Drilling Method - Augers 8" Casing_____/Size_____/Bit FR

Elev._____ Water Level NA Pipe Installed_____

==========

Comments:

==========

0.0-- ASPHALT 0.7	SPT/SHELBYS	PSI	RATE
BROWN SILTY GRAVEL	0.7-2.2	SS @	BAG
6.0 GREY SILT	2.0-3.0	BAG	
12.0 CLAYEE	6.0 BAG		
MOIST GREY SILT	DRILLED	TO 20'	
W/PEA GRAVEL.	NO SAMPLES		
20.0			
BOHT			

Project No. _____ Control No. 8021

Project Name RESEARCH PROGRAM Sta.: HOT SPRINGS

Core Log. No. CL-3-18-02 Hole No. 2

Driller MAYBERRY Crew JOHN SAM Geotech WING ON & GREG

Date 4/17/92 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FGR

Elev. _____ Water Level 16.0 WHILE DRILLING Pipe Installed _____

Comments:

0.0-- ASPHALT 0.8 BR	0.8 SS SPT/SHELBYS	PSI	RATE
SILT W/S GRAVEL	14"	BAG	
3.0 BROWN SILT	8.0	BAG	
8.5 GREY SILT	8.0.	BAG	
W/SOME GRAVEL	DRILLED TO 20'		
20.0	NO SAMPLES.		
BOH			

Montana Performance Prediction Models Contract
Field Data Report

Location: Perma
Longitude: 114°36' W
Lattitude: 47°30' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/17/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	0	0	0
	Length (Meters)	0.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Perma
Longitude: 114°36' W
Lattitude: 47°30' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/17/02
SURVEYOR 1: WT SURVEYOR 2: BS

DISTRESS TYPE		SEVERITY LEVEL N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING (Number)	0
	(Square Meters)	0.0
SURFACE DEFECTS		
11	BLEEDING (Square Meters)	0.0
12	POLISHED AGGREGATE (Square Meters)	0.0
13	RAVELING (Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING (Number)	0
	Length of Affected Pavement (Meters)	0.0
16	OTHER (Describe) no distress observed	

Reviewer: _____ Surveyors: WT/BS Pavement Temp:

Date: _____ Date: 4/17/02 Before_____ After_____

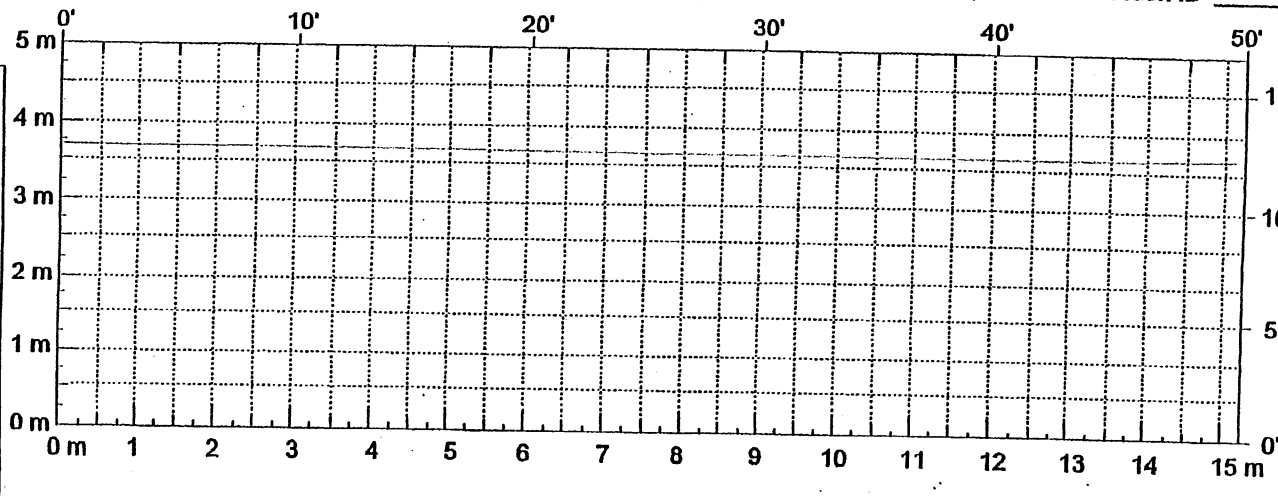
State Assigned ID _____

State Code _____

SHRP Section ID _____

Section Summary

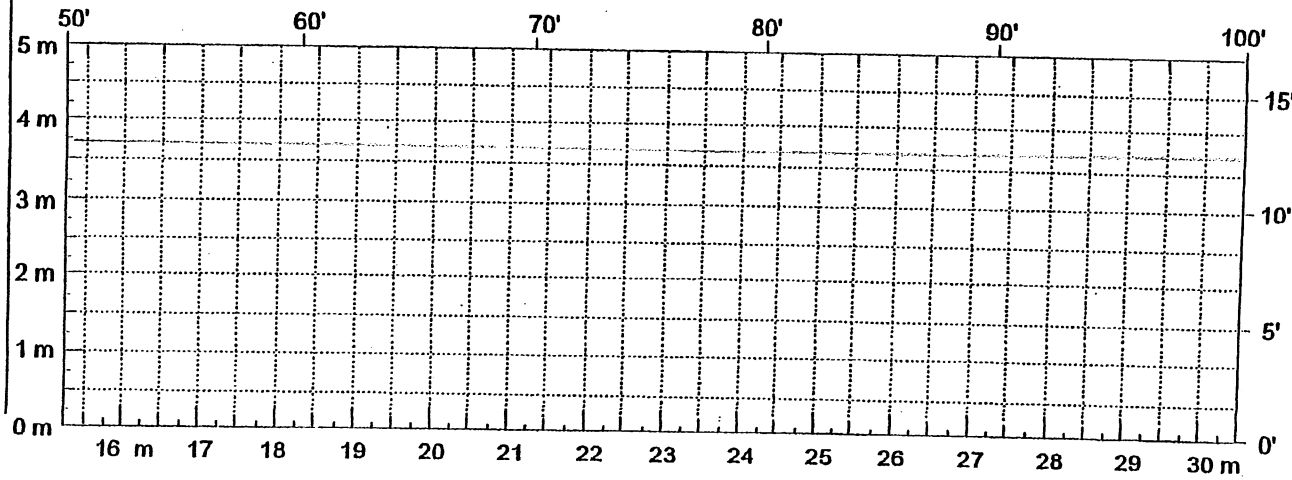
No distress observed



Sheet Summary

NONE

Comments: _____



Comments: _____

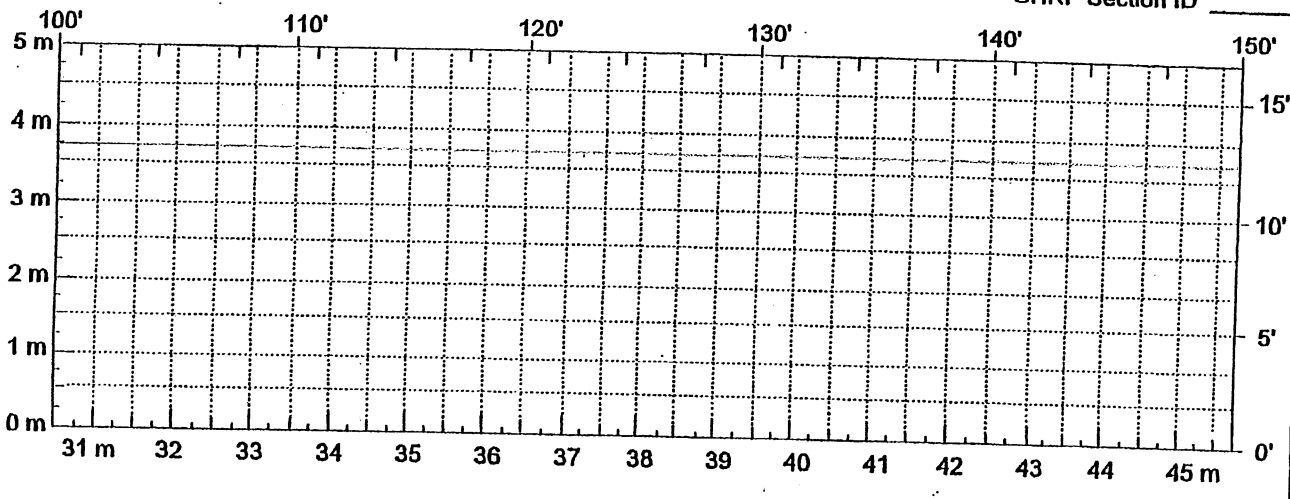
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/17/02

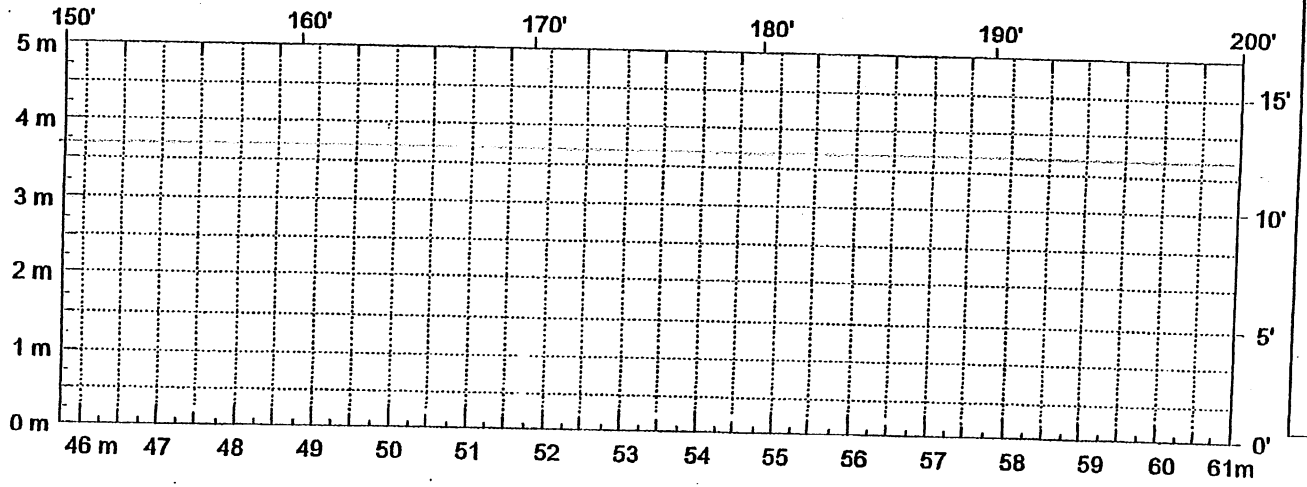
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

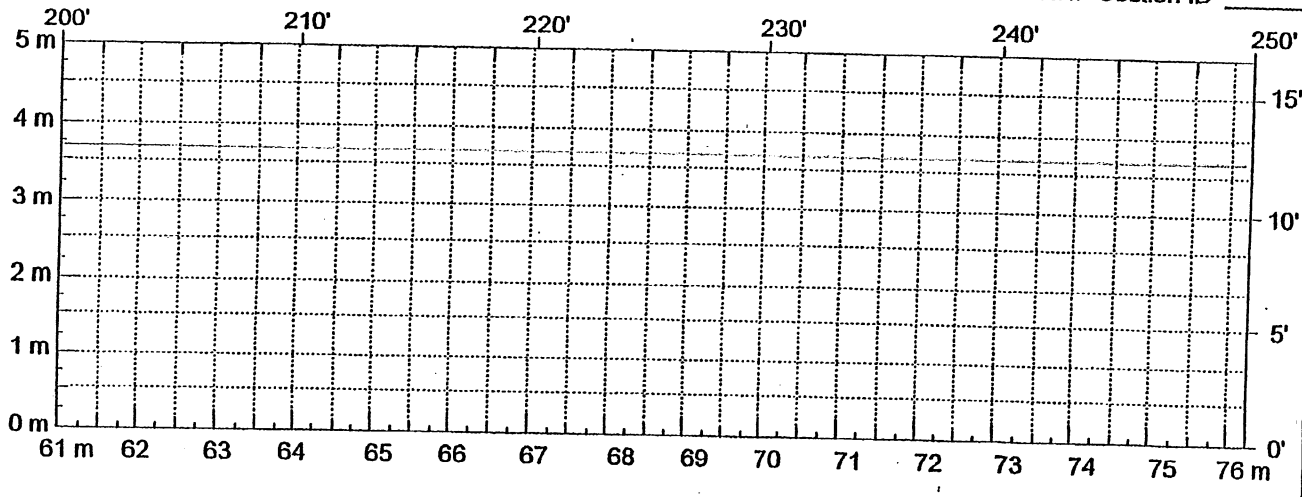
Reviewer: _____ Surveyors: LST (BS

Date: _____ Date: 4/17/02

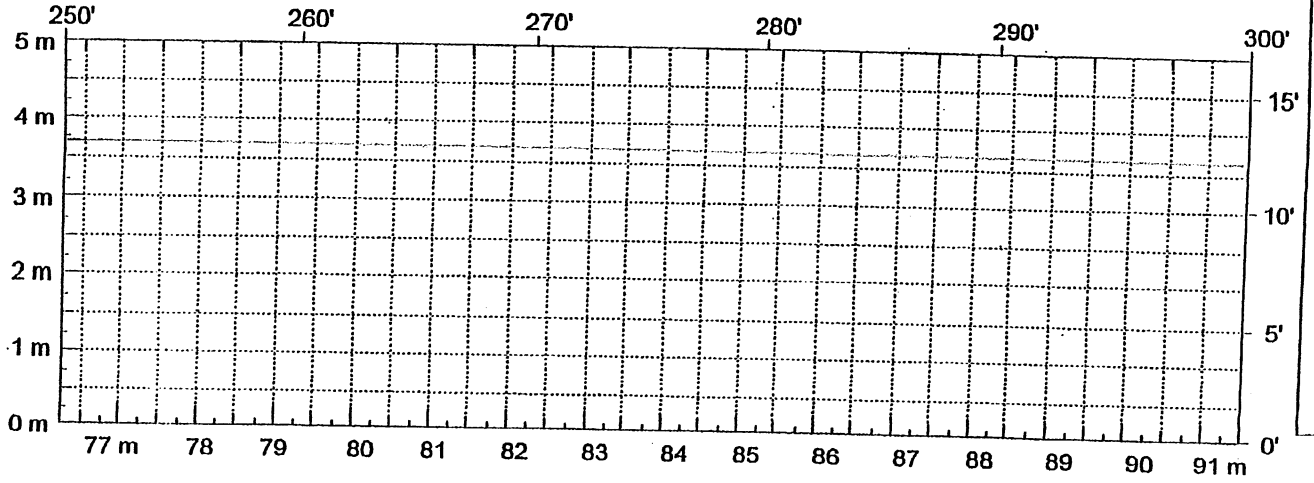
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

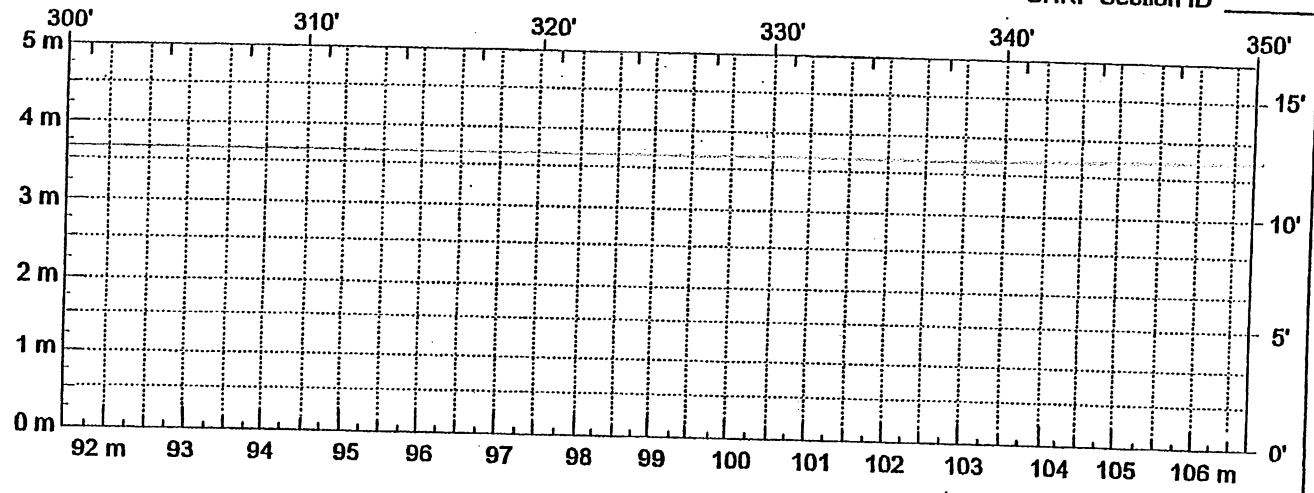
Reviewer: _____ Surveyors: WT/135

Date: _____ Date: 4/17/02

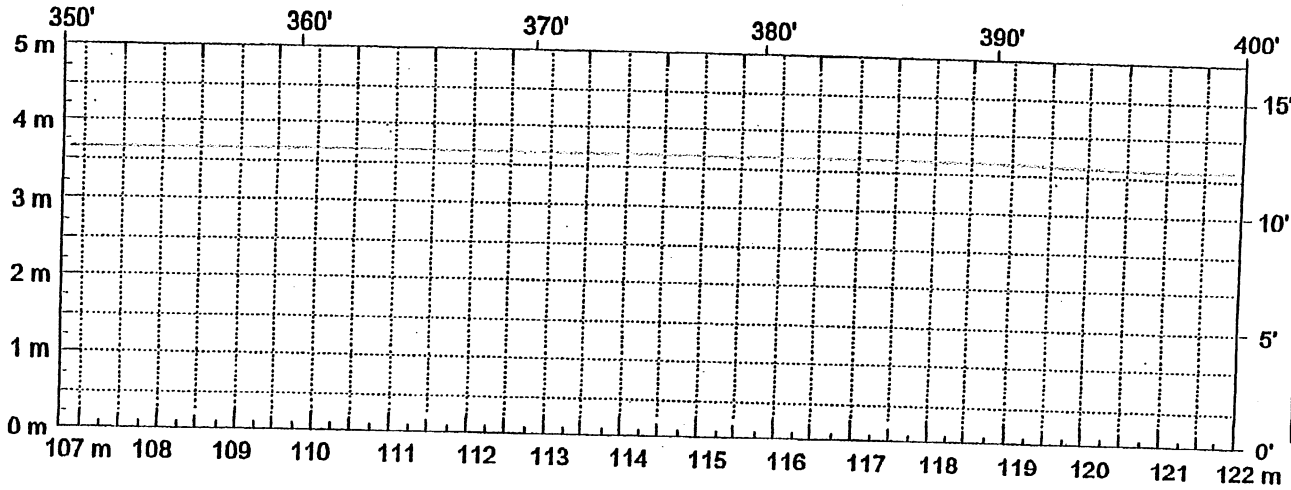
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/17/02

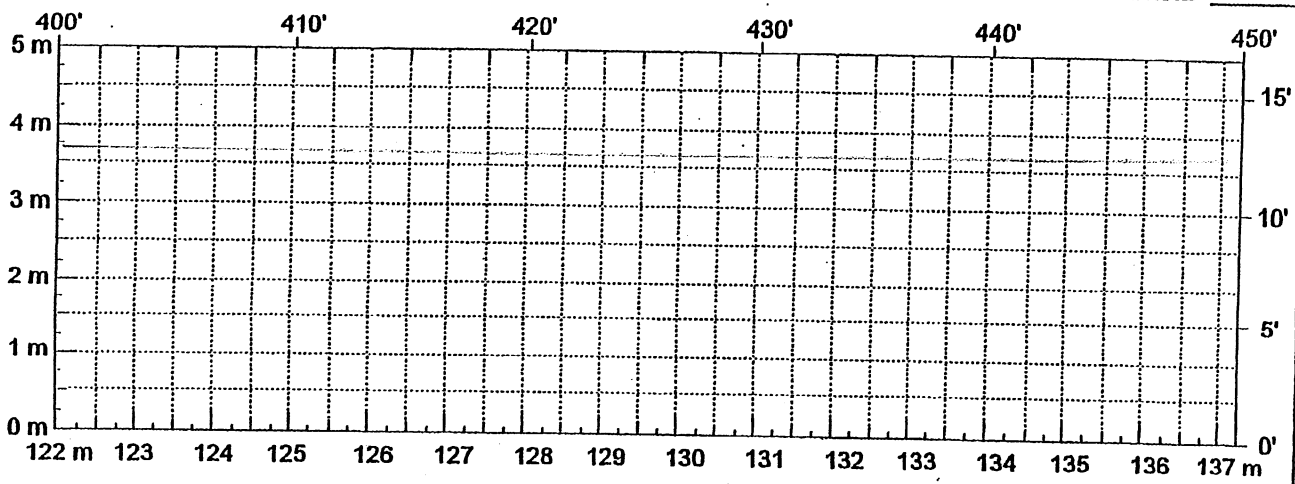
Pavement Temp:

After_____

State Assigned ID _____

State Code _____

SHRP Section ID _____



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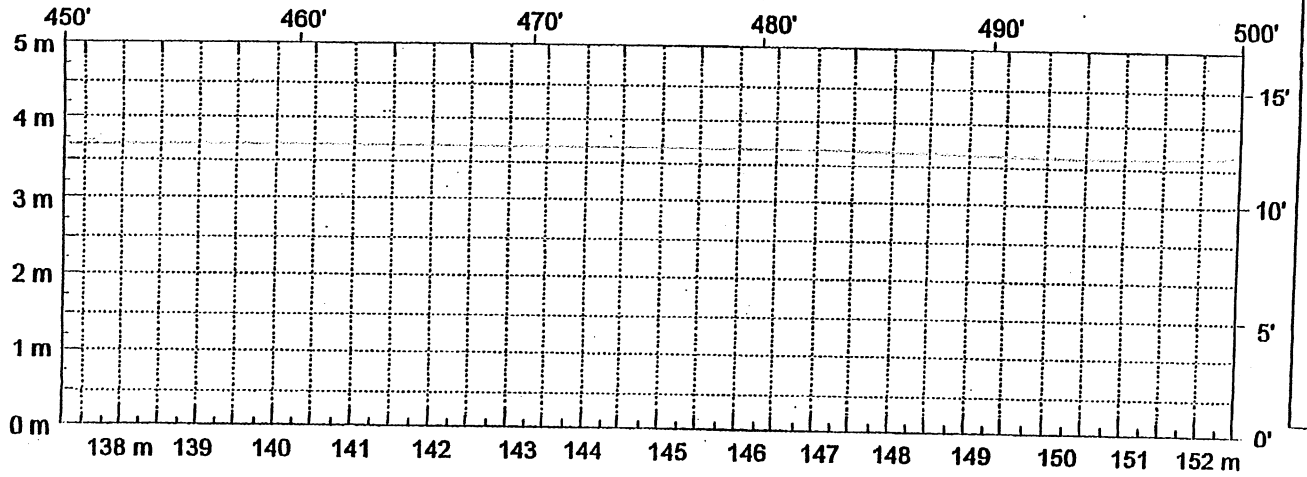


Comments: _____

Sheet Summary

NONE

Montana Performance Prediction Models Contract
Field Data Report

Location: Perma
Longitude: 114°36' W
Lattitude: 47°30' N

FWD Data

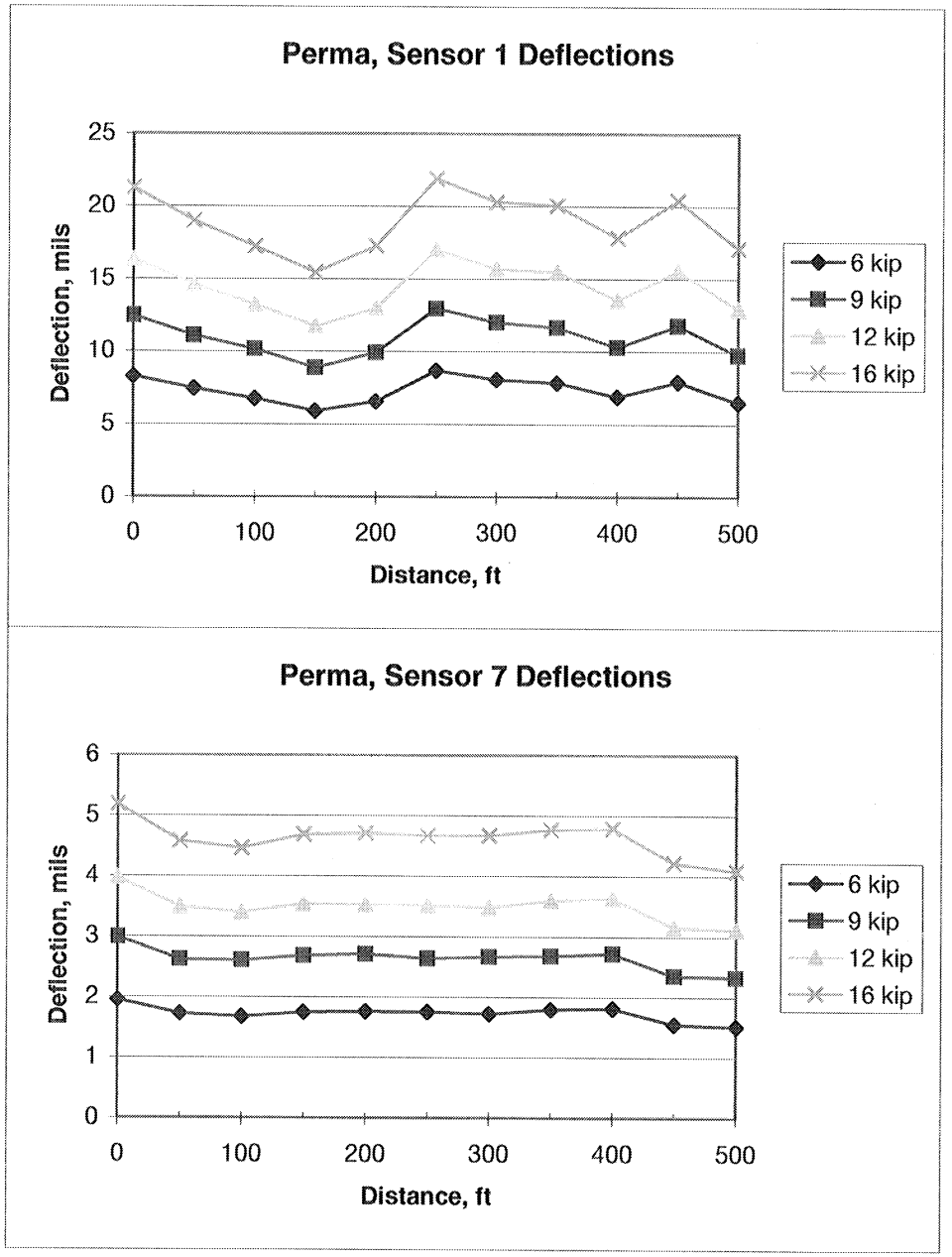
Test Date: 10/8/01

Layer	Material Type	Average Thickness in.
1	ACP	3.3
2	CSB	4.1
3	Base	6.0
4	Subgrade	-

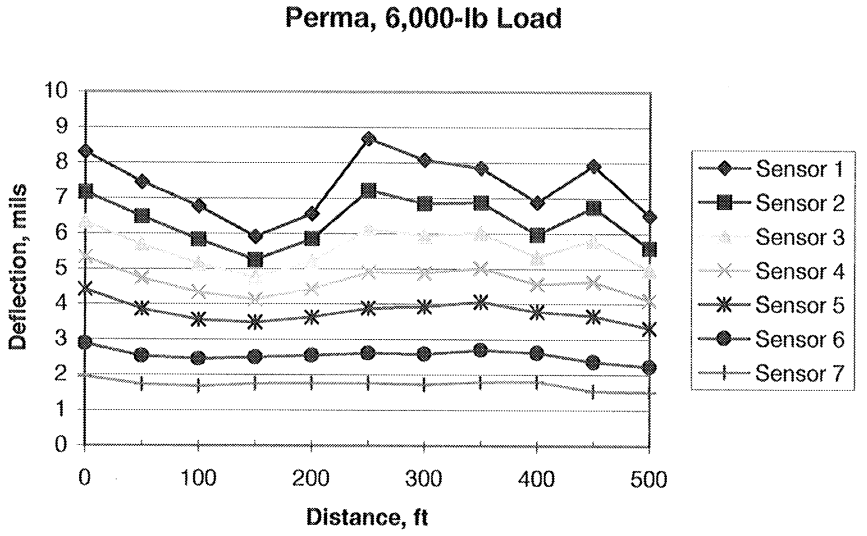
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.20	9.95	8.59	7.60	6.40	5.29	3.45	2.34
0+00	9.71	13.45	11.66	10.35	8.69	7.24	4.77	3.22
0+00	11.90	16.22	14.11	12.58	10.57	8.81	5.81	3.95
0+00	15.02	19.97	17.23	15.40	12.92	10.83	7.20	4.87
0+50	7.19	8.93	7.76	6.81	5.67	4.62	3.03	2.07
0+50	9.76	12.03	10.52	9.25	7.70	6.32	4.25	2.84
0+50	11.96	14.58	12.74	11.27	9.39	7.71	5.16	3.49
0+50	15.19	18.05	15.75	13.98	11.58	9.51	6.40	4.35
1+00	7.16	8.07	6.95	6.13	5.16	4.24	2.92	2.00
1+00	9.70	10.95	9.56	8.47	7.10	5.89	4.03	2.81
1+00	12.00	13.25	11.58	10.28	8.58	7.15	4.89	3.40
1+00	15.28	16.47	14.41	12.82	10.71	8.96	6.11	4.26
1+50	7.14	7.03	6.25	5.66	4.91	4.14	2.96	2.08
1+50	9.79	9.66	8.64	7.81	6.79	5.78	4.14	2.92
1+50	12.07	11.81	10.53	9.53	8.26	7.03	5.02	3.56
1+50	15.22	14.70	13.14	11.93	10.32	8.72	6.27	4.46
2+00	7.14	7.80	6.95	6.19	5.27	4.31	3.03	2.09
2+00	9.69	10.67	9.56	8.54	7.29	5.96	4.17	2.92
2+00	12.07	13.06	11.75	10.47	8.92	7.32	5.08	3.55
2+00	15.39	16.60	14.85	13.35	11.36	9.26	6.44	4.53
2+50	7.08	10.24	8.51	7.24	5.78	4.58	3.08	2.07
2+50	9.59	13.82	11.57	9.85	7.89	6.33	4.19	2.81
2+50	11.82	16.76	13.99	11.98	9.67	7.73	5.17	3.47
2+50	14.96	20.48	17.17	14.88	12.00	9.65	6.46	4.37

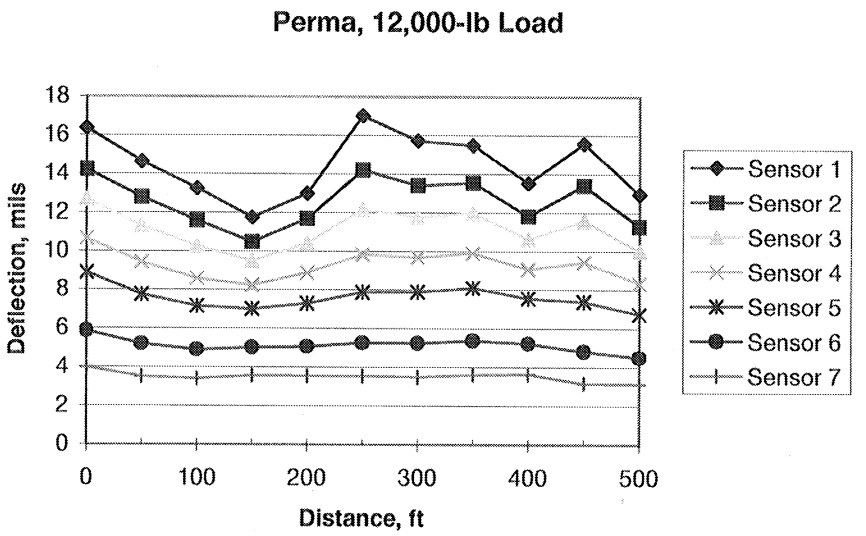
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	7.11	9.56	8.11	7.03	5.77	4.65	3.06	2.04
3+00	9.68	12.91	11.07	9.64	7.92	6.41	4.31	2.87
3+00	11.89	15.56	13.27	11.66	9.58	7.79	5.18	3.45
3+00	15.04	19.10	16.49	14.54	11.95	9.72	6.44	4.39
3+50	7.06	9.23	8.08	7.08	5.90	4.77	3.17	2.11
3+50	9.61	12.45	10.93	9.62	7.98	6.49	4.34	2.86
3+50	11.95	15.41	13.49	11.93	9.85	8.05	5.34	3.58
3+50	15.15	18.98	16.77	14.78	12.23	9.99	6.68	4.51
4+00	7.07	8.11	7.03	6.28	5.37	4.45	3.08	2.13
4+00	9.65	11.04	9.61	8.62	7.36	6.13	4.20	2.91
4+00	12.01	13.54	11.83	10.64	9.06	7.55	5.21	3.64
4+00	14.98	16.70	14.59	13.07	11.15	9.32	6.43	4.48
4+50	7.18	9.47	8.06	6.95	5.54	4.38	2.83	1.85
4+50	9.69	12.69	10.91	9.42	7.59	5.97	3.88	2.53
4+50	11.86	15.38	13.24	11.45	9.31	7.29	4.75	3.12
4+50	15.02	19.16	16.47	14.28	11.55	9.15	5.95	3.96
5+00	7.11	7.69	6.61	5.87	4.86	3.93	2.64	1.79
5+00	9.70	10.53	9.14	8.12	6.72	5.47	3.62	2.51
5+00	11.95	12.90	11.23	9.96	8.30	6.71	4.47	3.10
5+00	15.07	16.12	13.98	12.44	10.28	8.33	5.58	3.85

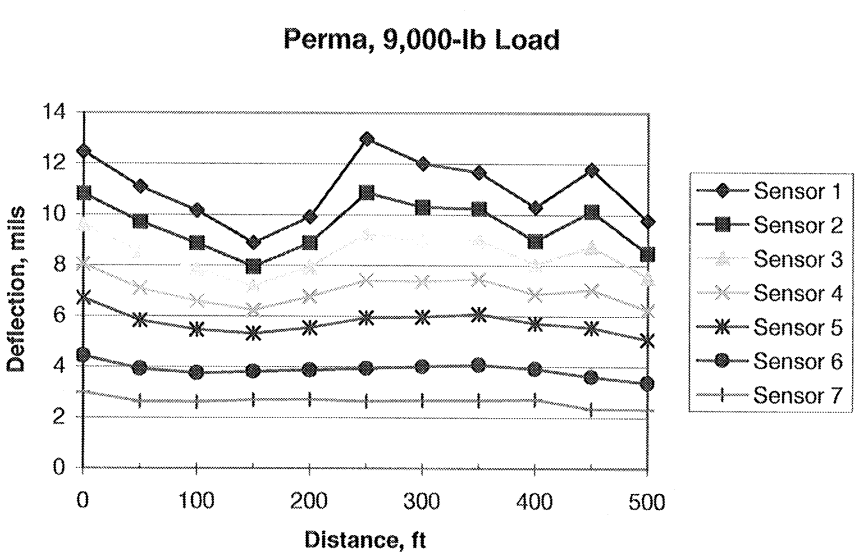
FWD Deflections

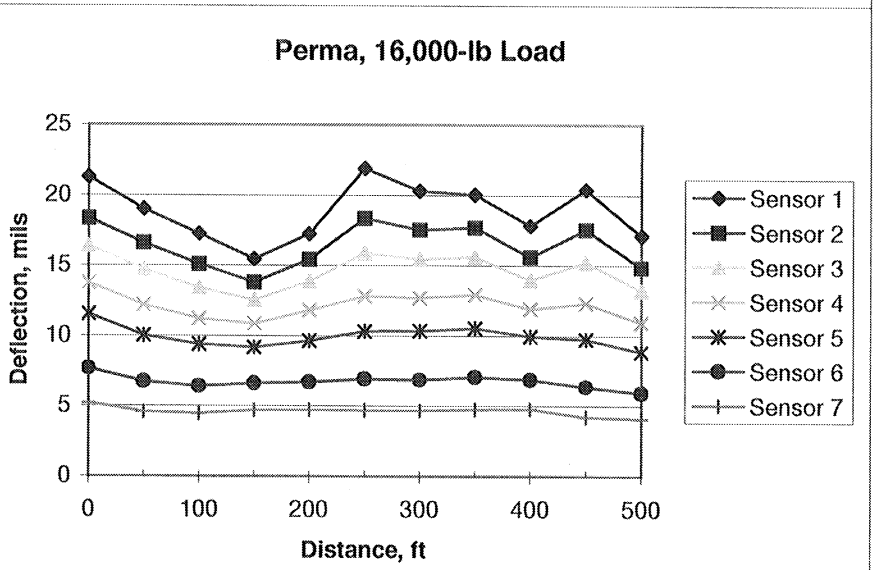


Montana DOT - Performance Prediction Models
FWD Deflections









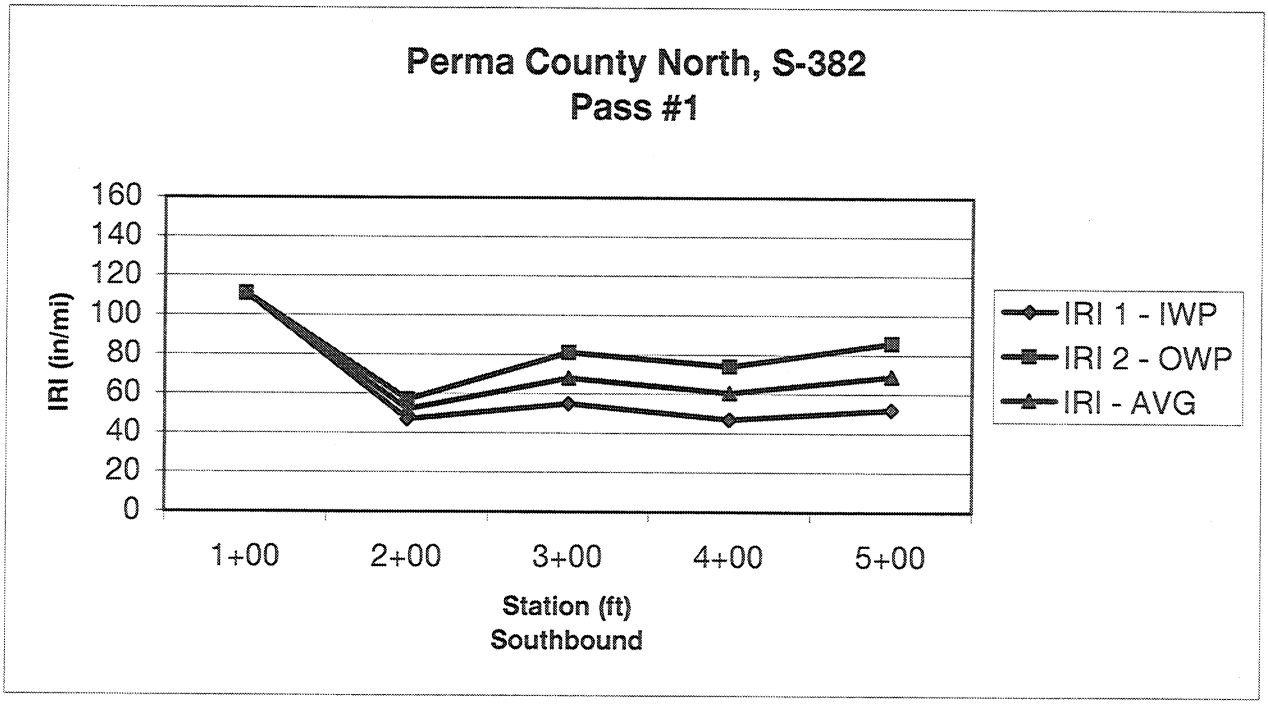
Montana Performance Prediction Models Contract
Field Data Report

Location: Perma
Longitude: 114°36' W
Lattitude: 47°30' N

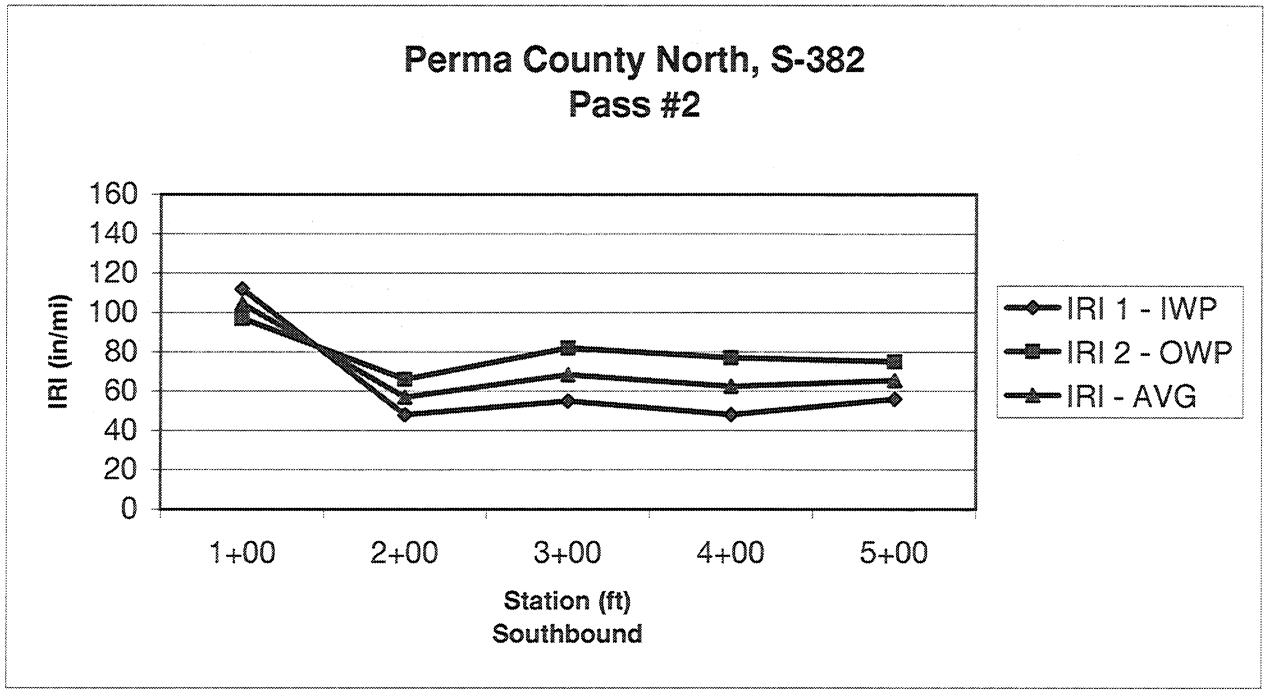
Profile Data

Test Date: 10/15/01

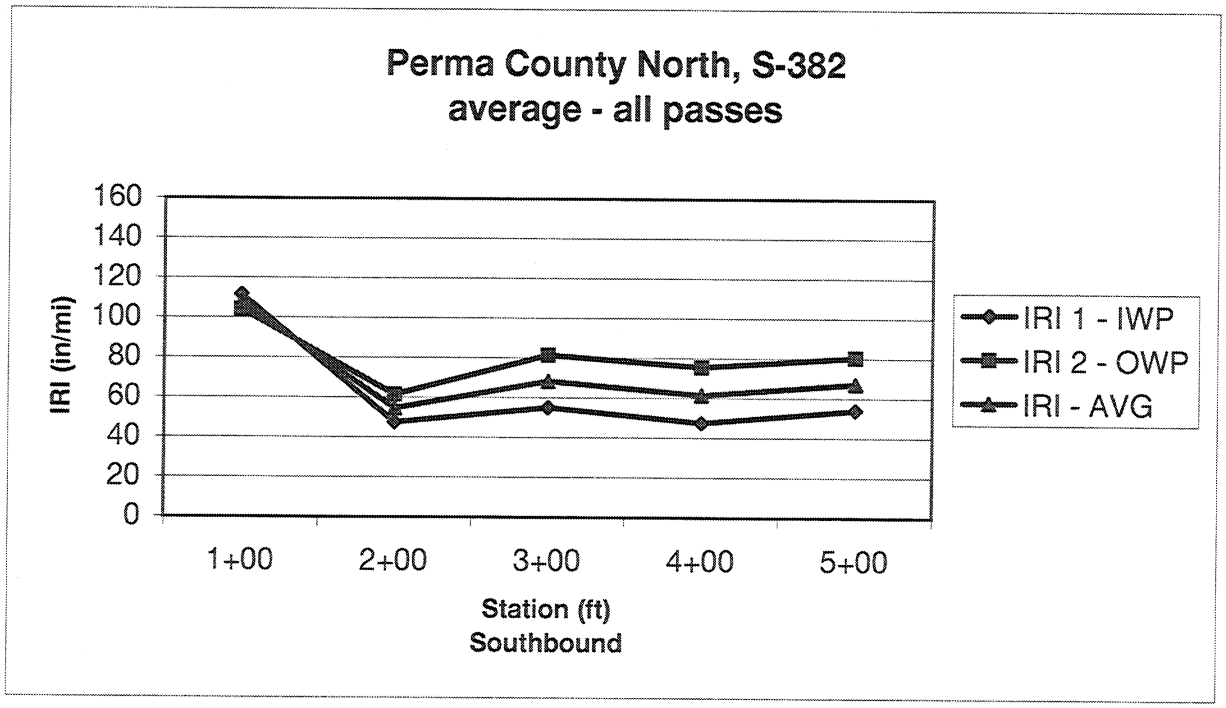
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.05	0.025	111	111	111
2+00	100	200	100	0.04	0.02	47	57	52
3+00	200	300	100	0.06	0.023	55	81	68
4+00	300	400	100	0.07	0.022	47	74	61
5+00	400	500	100	0.08	0.023	52	86	69
AVG.				0.06	0.023	62.4	81.8	72.1
STD.				0.016	0.002	27.382	19.665	22.794



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.04	0.022	112	97	105
2+00	100	200	100	0.04	0.019	48	66	57
3+00	200	300	100	0.06	0.022	55	82	69
4+00	300	400	100	0.07	0.021	48	77	63
5+00	400	500	100	0.09	0.023	56	75	66
AVG.				0.06	0.021	63.8	79.4	71.6
STD.				0.021	0.002	27.207	11.415	18.876



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.05	0.024	111.5	104	107.75
2+00	100	200	100	0.04	0.020	47.5	61.5	54.5
3+00	200	300	100	0.06	0.023	55	81.5	68.25
4+00	300	400	100	0.07	0.022	47.5	75.5	61.5
5+00	400	500	100	0.09	0.023	54	80.5	67.25
AVG.				0.060	0.022	63.1	80.6	71.9
STD.				0.018	0.002	27.284	15.323	20.803



APPENDIX D

CONDON

Montana Performance Prediction Models Contract
Field Data Report

Location:	Condon
Longitude:	113°44' W
Lattitude:	47°33' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	5.5	5.3	5.4	Chip Seal
2	Pulverized	8.8	9.2	9.0	
3	Base	26.8	21.5	24.1	Dark Brwn Clayey Grvl(some Wooden Frag.)
4	Subgrade	-	-	-	Brwn-Red Sandy Clay w/ Coarse & Fine Grvl

Materials Sampling

Date: 4/18/02

Material Type	Quantity	Comments
ACP	14 cores	2-10" & 12-6" cores
Pulverized	3 bags	1 split spoon
Base	7 bags	3 split spoon, 1 TBD
Subgrade	6 bags	1 split spoon

SHRP REGION _____ STATE CODE _____

STATE MT

SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING

LTPP EXPERIMENT Condon N ROUTE/HIGHWAY P-83 Lane _____ Direction NB

SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V#1 (b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-18-02 LOCATION STATION: RP43.45 (N. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	6.25" PMS	PMS	
2	8"	Pulver EC	Split spoon 45 blows 2.1' From surface
3		dk brn clayey gravel & 10% wood frags existing EC	6.25" - 14.25" sample
4			
5		Hit rock @ ~24"	19" - 24" sample Exist Base Coarse
6	41"		
7		Split Spoon brn - red brn sandy cly w/ fine gravel Subgrade ?	Split spoon. 30 blows 1.5' 29" - 46"
8	52"		
9	64"	Auger - dk brn clayey coarse gravel	Sample (29" - 34")
10	H_2O @ 4'4" ▽ 9:40AM		
11			Sample 34" - 52"
12	11.5'	org brn - brn sandy, clayey gravel Subgrade	Sample 52" - 64"
13			
14			
15		Coarse gravel w minor cly dk brn	Sample 64" 100"
16	16.0'		
17		Finer clayey gravel dk brn	
18		Coarse gravel w/ minor dk brn cly	
19	18.5'		
20	19.0'	Finer clayey gravel	
		ltbuff sandy clay wet/sat.	

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

SHRP REGION _____ SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT

LTPP EXPERIMENT Condon N ROUTE/HIGHWAY P-83 Lane _____ Direction NB

SAMPLE/TEST: (a) Before Section _____ (b) After Section ✓ #2 FIELD SET NO. _____

SHRP ASSIGNED ID _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4 - 18 - 02 LOCATION STATION: RP 43.45 (S. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	5.5"	PMS	
2	9.0"	Pulverized BC	Split Spoon 51 blows 1.5' Sample 5.5" – 19.5" (2x Sa...)
3	14.0"	Pulverized Base Course	
4	36"	Existing Base	Split Spoon @ 20" 28 blows 1.5' Sample 18" – 32"
5		dk brn w/org crst coarse gravel w/ sandy clg fines	
6			Sample 20" – 32"
7	H20 @ 9'34	Locally Very coarse gravel > 1.5-2.0"	
8			Split Spoon @ 32" 26 Blows 1.5' NS
9	▽		
10	≈ 11:30 AM		32" – 50" Sample
11			Sample 50" – 85"
12			
13	13		
14		dk brn sandy clg some gravel	
15			
16			
17			
18	18		
19		damp-wet sticky tan Plastic clay w fine gravel	
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED
G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
_____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

Project No. _____ Control No. 8021

Project Name RESEARCH PROJ Sta.: CONDON

Core Log. No. CL-3-19-02 Hole No. 1

Driller MAYBERRY Crew JOHN. SAM Geotech WENDON

Date 4/18/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FOR

Elev. _____ Water Level _____ Pipe Installed _____

Comments:

	SPT/SHELBYS	PSI	RATE
0.0-- ASPHALT 0.6.			
0.6 - DRK BR	0.6 - 2.1	SS	
GRAVEL - SANDY	1.4 BAG		
GRAVEL 20.0	2.4 - 3.9	SS	
BOT	43" BAG		
	4.2' BAG		
	5.5 BAG		
	8.3 BAG		
	DRILLED TO	20	
		NO SAMPLE	

Project No._____ Control No. 8021

Project Name RESEARCH PROJ Sta.: COWDOWN

Core Log. No. CL-3-20-02 Hole No. 2

Driller MAYBERRY Crew JOHN-SAM Geotech WING DO

Date 4/18/02 Drill SIMCO Shelbys_____ # Bag Samples_____

Drilling Method - Augers 8" Casing_____/Size_____/Bit F6R

Elev._____ Water Level 14.0 Pipe Installed_____

==========

Comments:

==========

0.0-- ASPHALT-0.5	SPT/SHELBYS	PSI	RATE
DK BROWN SANDY	0.5-2.0	SS	
GRAVEL	14" BAL		
20.0	14" 32"	SS	
BOH	32" BAG		
?	28" - 36"	SS	
	50" BAG		
	86" BAG		
	DRILLED TO 20 NO SAMP		
636 a7			

Montana Performance Prediction Models Contract
Field Data Report

Location: Condon
Longitude: 113°44' W
Lattitude: 47°33' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/18/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	1.6	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	15.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	0	0	0
	Length (Meters)	0.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Condon
Longitude: 113°44' W
Lattitude: 47°33' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/18/02
SURVEYOR 1: WT SURVEYOR 2: BS

DISTRESS TYPE		SEVERITY LEVEL N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING	
	(Number)	0
	(Square Meters)	0.0
SURFACE DEFECTS		
11	BLEEDING	
	(Square Meters)	0.0
12	POLISHED AGGREGATE	
	(Square Meters)	0.0
13	RAVELING	
	(Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING	
	(Number)	0
	Length of Affected Pavement (Meters)	0.0
16	OTHER (Describe) snow plough damage on shoulder stripe throughout section	

Reviewer: _____ Surveyors: WT / BS

Date: _____ Date: 4/15/02

Pavement Temp:

Before_____ After_____

State Assigned ID _____

State Code _____

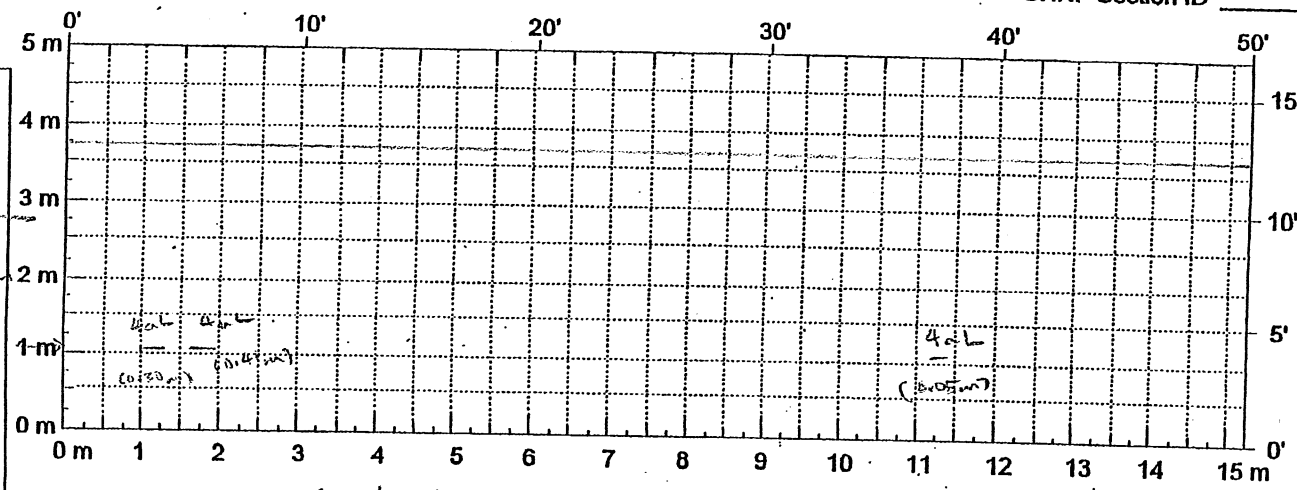
SHRP Section ID _____

Section Summary

4aL = 0.76m + 0.18m

4aL = 1.52m

4bL = 0.40m + 6.11m + 8.49m = 15.00m



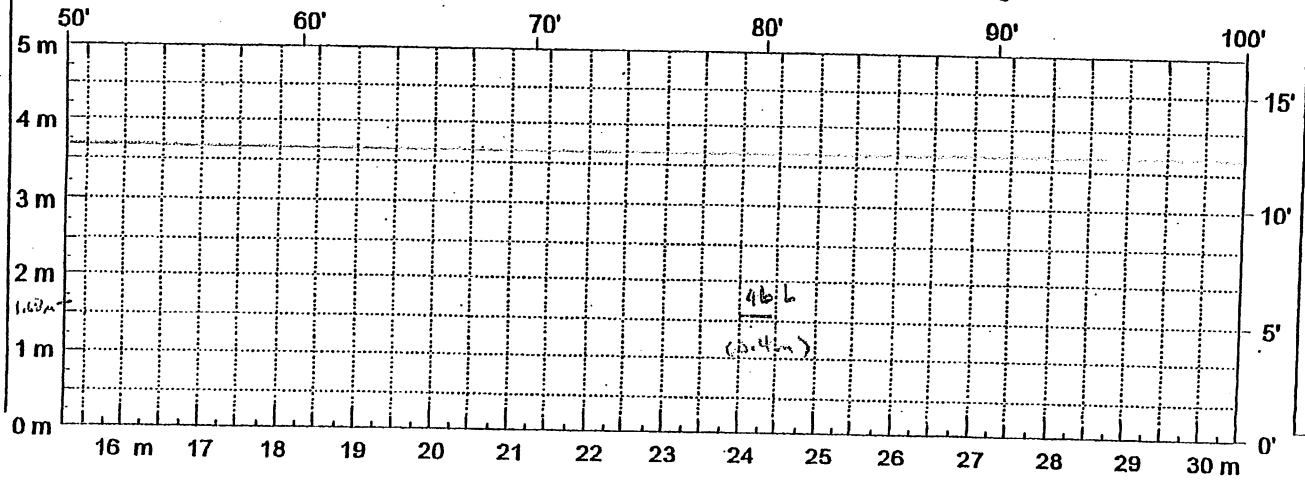
Sheet Summary

4aL = 0.30 + 0.61 + 0.45

4aL = 0.76m

4bL = 0.40m

Comments: Snow plough damage on outer stripe throughout the section



Comments: _____

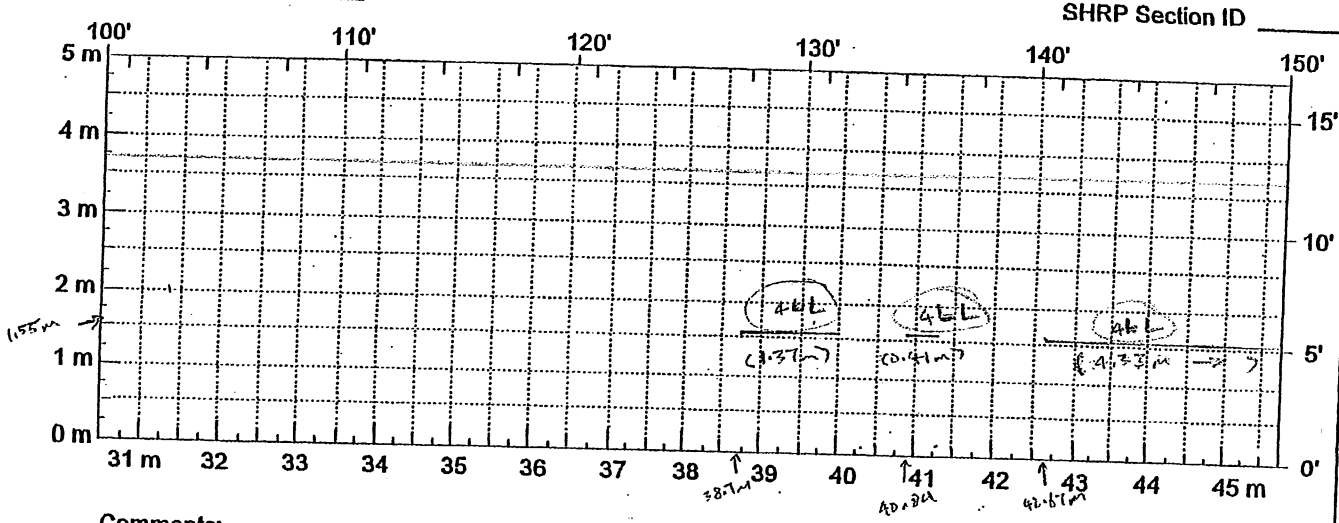
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/18/22

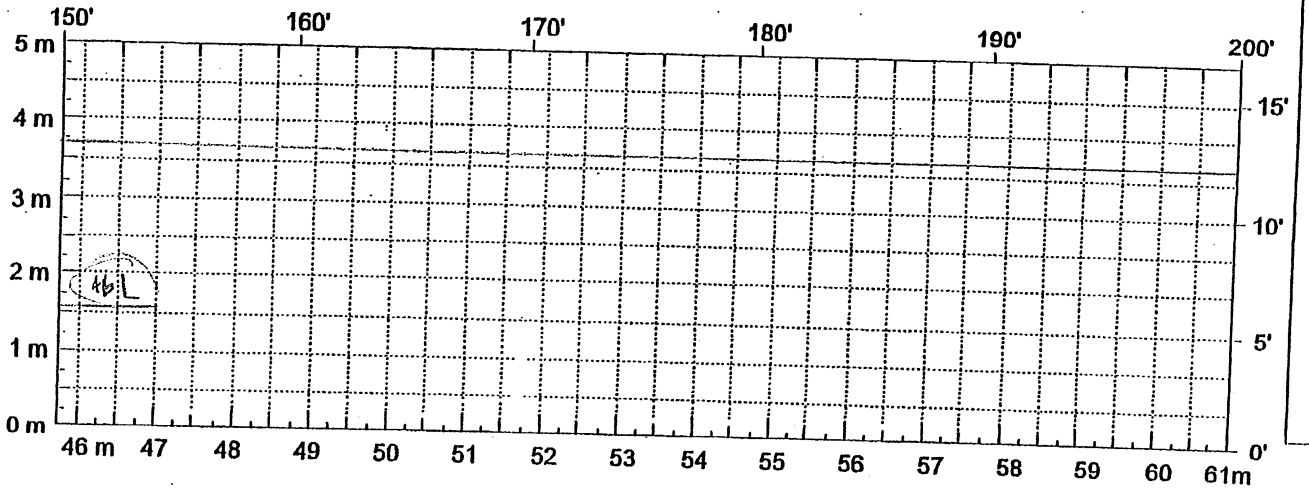
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

4bL: 1.37 + 0.41 + 4.33

4bL = 6.11 m

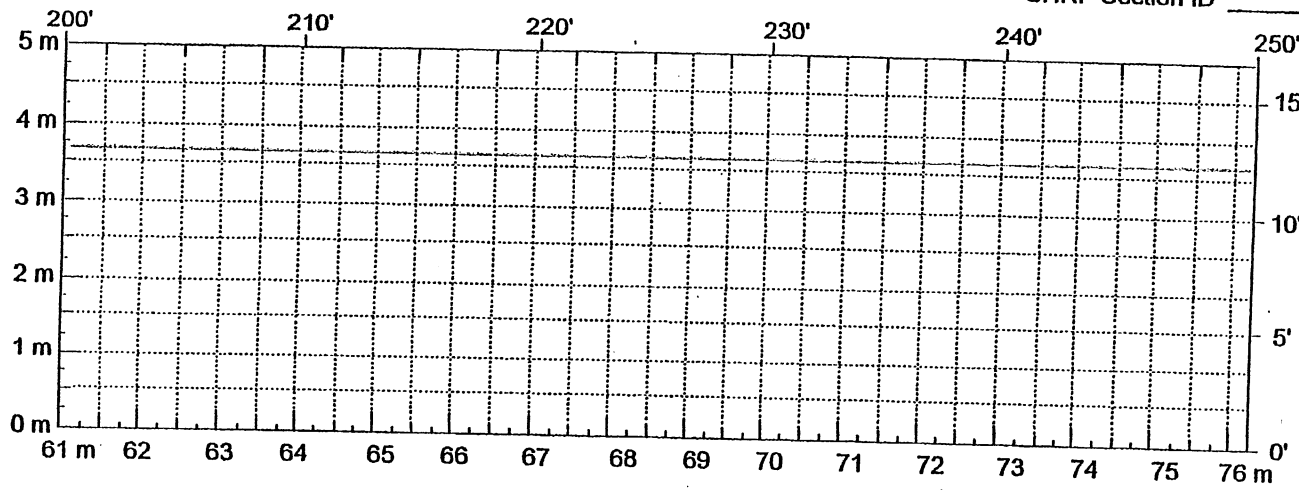
Reviewer: _____ Surveyors: WT/SS

Date: _____ Date: 4/18/03

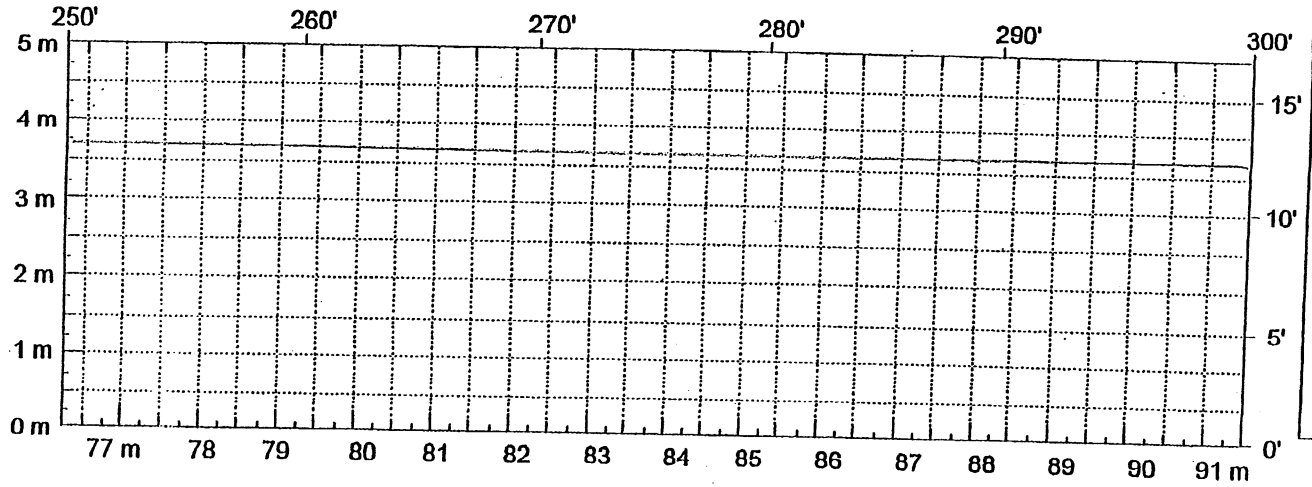
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

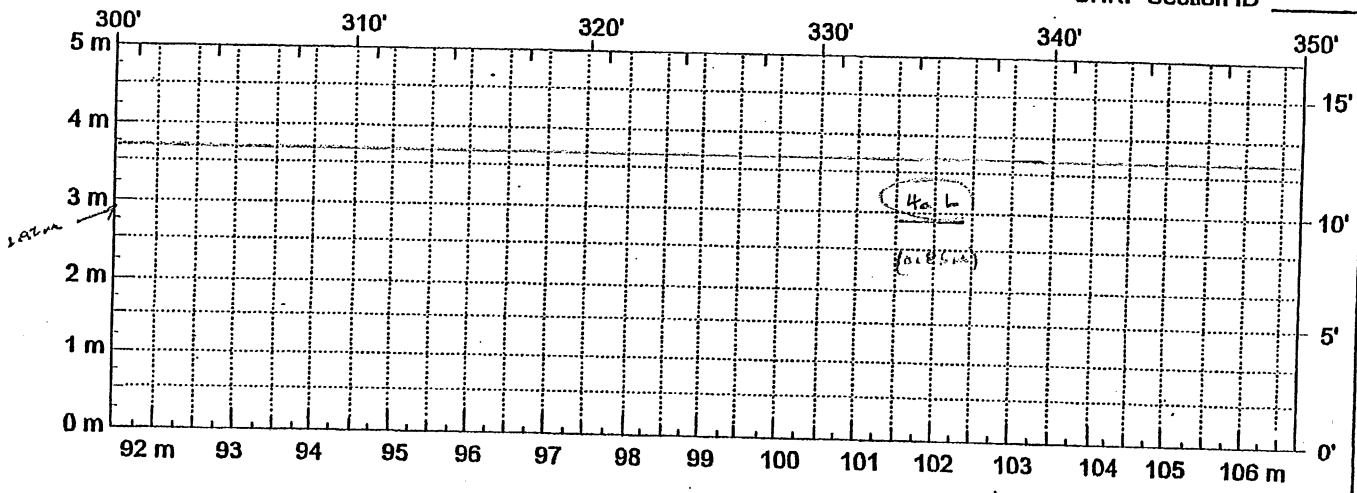
Reviewer: _____ Surveyors: WS | RS

Date: _____ Date: 4/18/02

State Assigned ID _____

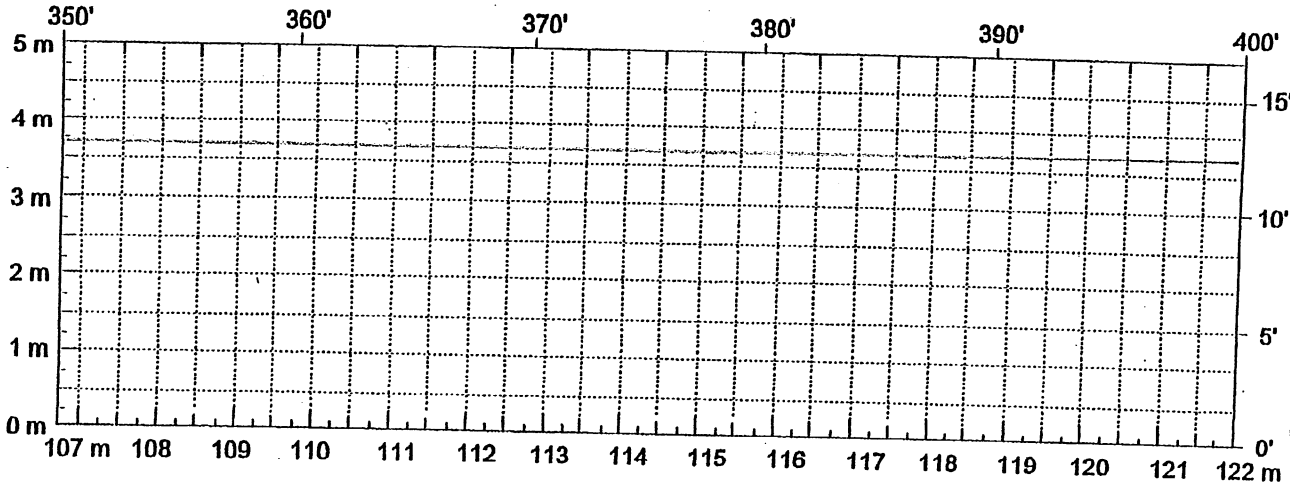
State Code _____

SHRP Section ID _____



Sheet Summary

Comments: _____



Comments: _____

Reviewer: _____ Surveyors: WJT/BS

Date: _____ Date: 4/18/02

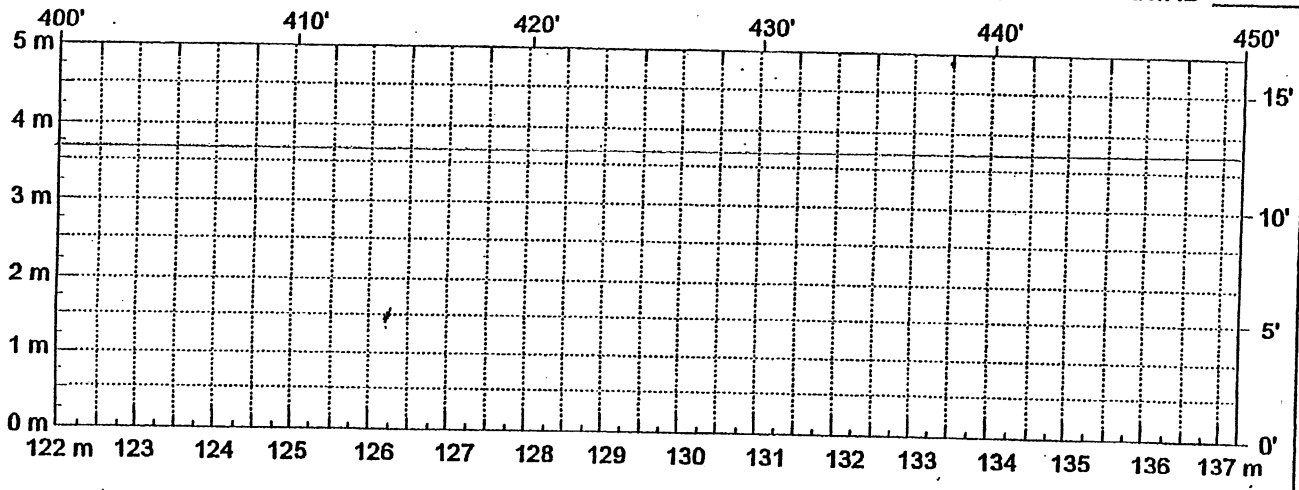
Pavement Temp:

After_____

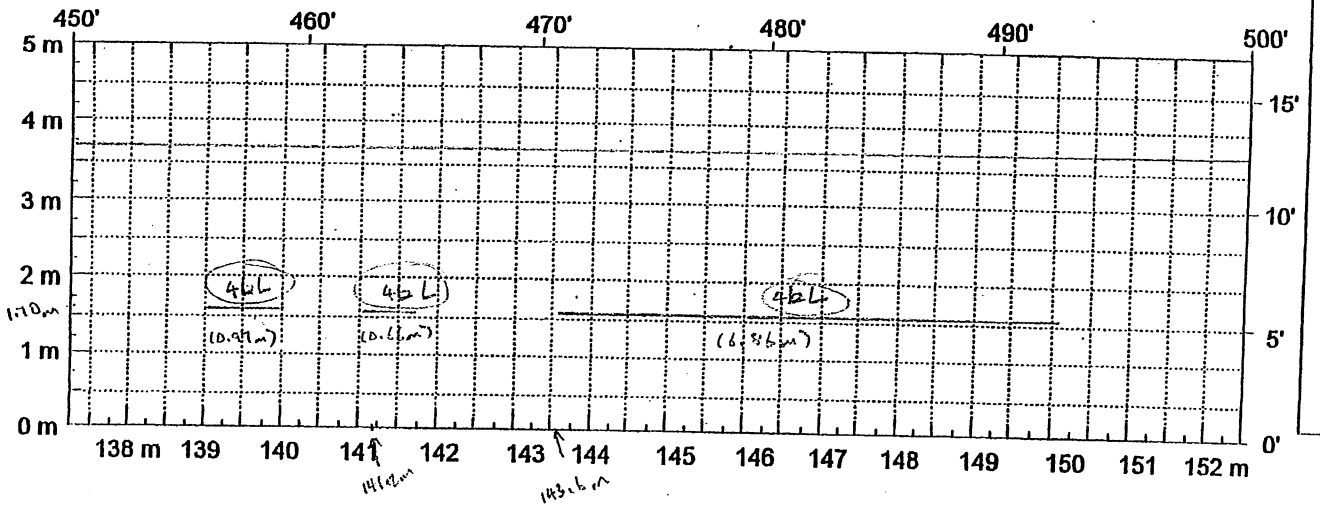
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

46L 0.97+
0.56+
6.86

46L 8.49 m

Montana Performance Prediction Models Contract
Field Data Report

Location: Condon
Longitude: 113°44' W
Lattitude: 47°33' N

FWD Data

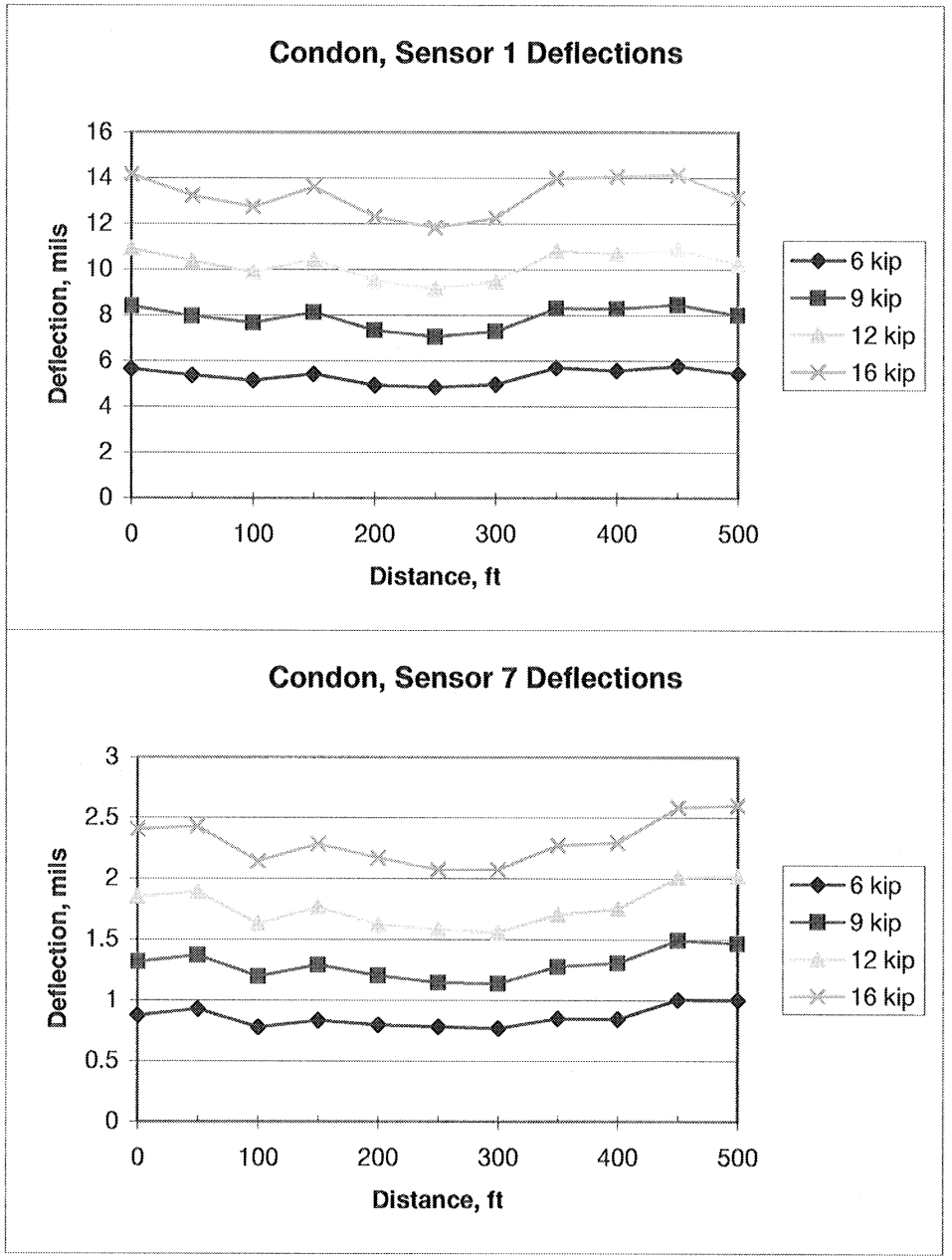
Test Date: 10/8/01

Layer	Material Type	Average Thickness in.
1	ACP	5.4
2	Pulverized	9.0
3	Base	24.1
4	Subgrade	-

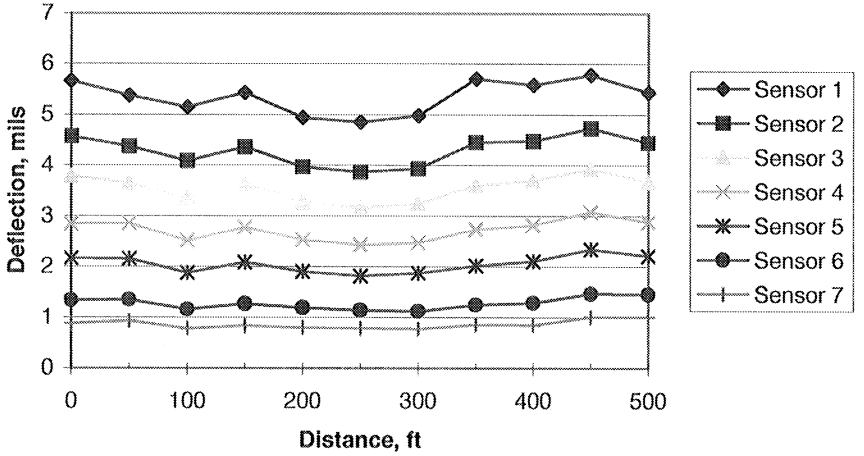
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	6.92	6.52	5.26	4.36	3.28	2.49	1.53	1.01
0+00	9.77	9.11	7.49	6.27	4.77	3.62	2.19	1.43
0+00	12.33	11.21	9.25	7.74	5.97	4.54	2.84	1.90
0+00	15.51	13.72	11.28	9.49	7.40	5.62	3.48	2.33
0+50	6.87	6.14	4.99	4.17	3.26	2.46	1.54	1.06
0+50	9.74	8.60	7.00	5.91	4.56	3.50	2.21	1.48
0+50	12.13	10.48	8.58	7.26	5.66	4.34	2.77	1.91
0+50	15.50	12.81	10.50	8.90	7.00	5.36	3.46	2.35
1+00	6.87	5.88	4.67	3.84	2.87	2.14	1.32	0.89
1+00	9.63	8.20	6.58	5.42	4.11	3.07	1.89	1.28
1+00	12.24	10.07	8.20	6.74	5.15	3.87	2.43	1.66
1+00	15.55	12.37	9.99	8.31	6.34	4.83	3.04	2.08
1+50	6.84	6.18	4.96	4.13	3.16	2.37	1.44	0.95
1+50	9.70	8.75	7.10	5.96	4.58	3.46	2.11	1.39
1+50	12.18	10.59	8.69	7.33	5.67	4.30	2.66	1.79
1+50	15.56	13.22	10.77	9.12	7.11	5.40	3.41	2.22
2+00	6.79	5.58	4.48	3.71	2.86	2.15	1.34	0.90
2+00	9.60	7.81	6.40	5.34	4.11	3.12	1.97	1.28
2+00	12.16	9.63	7.89	6.58	5.13	3.90	2.51	1.64
2+00	15.51	11.92	9.74	8.20	6.41	4.90	3.09	2.10
2+50	6.83	5.51	4.39	3.60	2.76	2.06	1.29	0.89
2+50	9.75	7.63	6.17	5.09	3.88	2.95	1.83	1.24
2+50	12.15	9.28	7.55	6.27	4.82	3.68	2.31	1.60
2+50	15.53	11.47	9.35	7.74	6.00	4.59	2.91	2.01

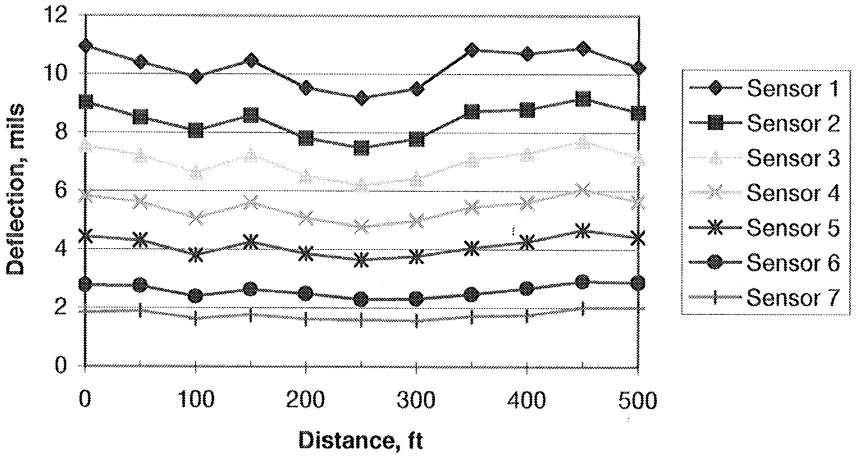
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	6.72	5.56	4.40	3.63	2.76	2.09	1.25	0.86
3+00	9.59	7.76	6.32	5.19	3.99	3.03	1.86	1.21
3+00	12.08	9.54	7.82	6.44	5.00	3.78	2.32	1.57
3+00	15.37	11.76	9.69	7.95	6.24	4.74	2.97	1.99
3+50	6.78	6.43	5.02	4.06	3.08	2.27	1.40	0.96
3+50	9.66	8.90	7.15	5.76	4.38	3.27	2.02	1.37
3+50	12.19	10.98	8.84	7.18	5.52	4.11	2.50	1.73
3+50	15.35	13.40	10.69	8.83	6.84	5.11	3.16	2.18
4+00	6.75	6.27	5.03	4.15	3.16	2.36	1.44	0.95
4+00	9.59	8.81	7.15	5.90	4.51	3.41	2.15	1.39
4+00	12.07	10.74	8.82	7.32	5.61	4.27	2.68	1.76
4+00	15.42	13.54	10.89	9.04	6.93	5.33	3.35	2.21
4+50	6.70	6.44	5.27	4.38	3.43	2.61	1.63	1.12
4+50	9.54	8.96	7.45	6.25	4.86	3.74	2.34	1.58
4+50	12.21	11.06	9.31	7.83	6.14	4.73	2.96	2.04
4+50	15.25	13.45	11.36	9.51	7.49	5.76	3.66	2.46
5+00	6.83	6.18	5.05	4.18	3.27	2.51	1.65	1.14
5+00	9.64	8.57	7.10	5.90	4.64	3.58	2.30	1.57
5+00	12.15	10.34	8.78	7.22	5.69	4.47	2.91	2.04
5+00	15.46	12.68	10.63	8.85	7.01	5.50	3.58	2.51

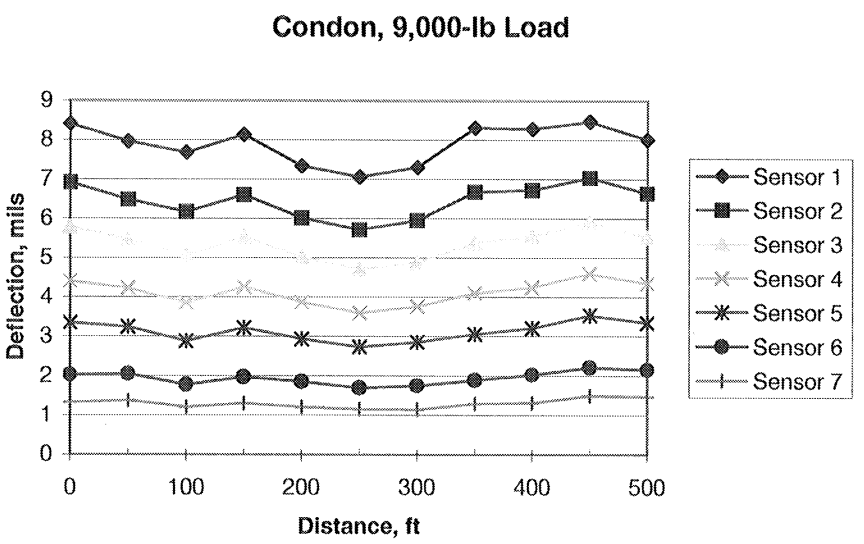
FWD Deflections

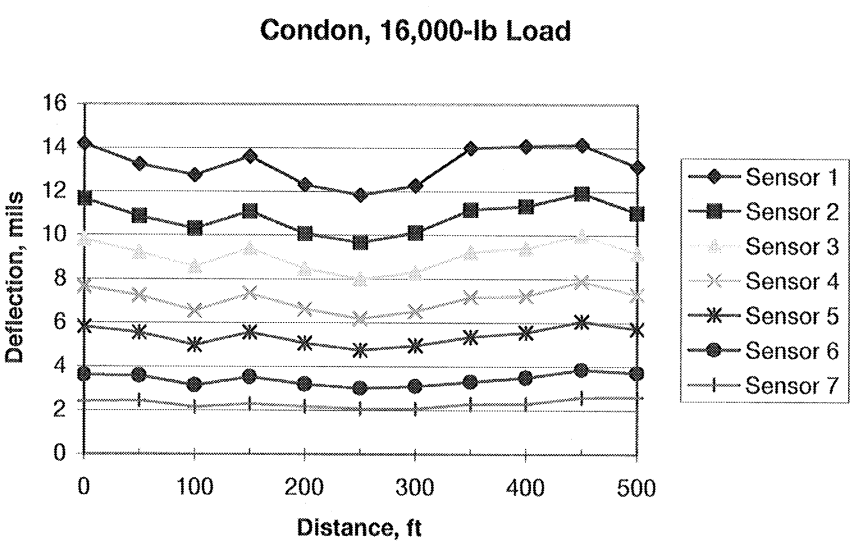


Montana DOT - Performance Prediction Models
FWD Deflections









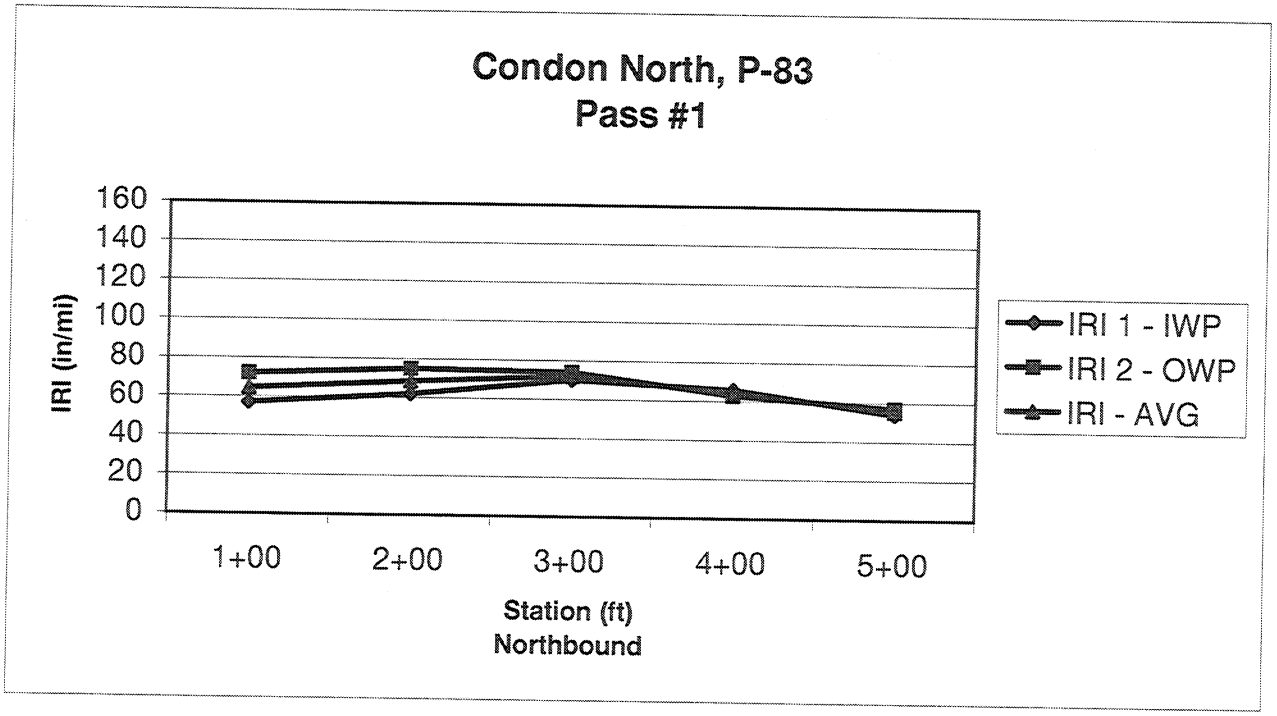
Montana Performance Prediction Models Contract
Field Data Report

Location: Condon
Longitude: 113°44' W
Lattitude: 47°33' N

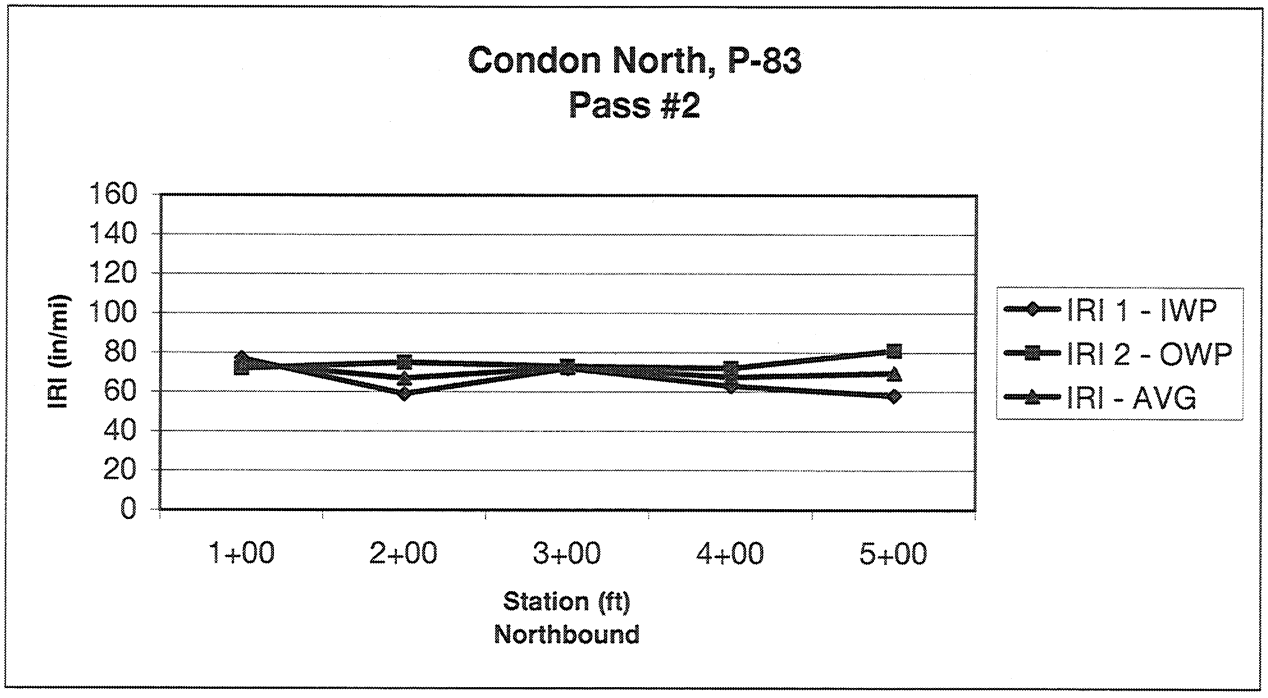
Profile Data

Test Date: 10/15/01

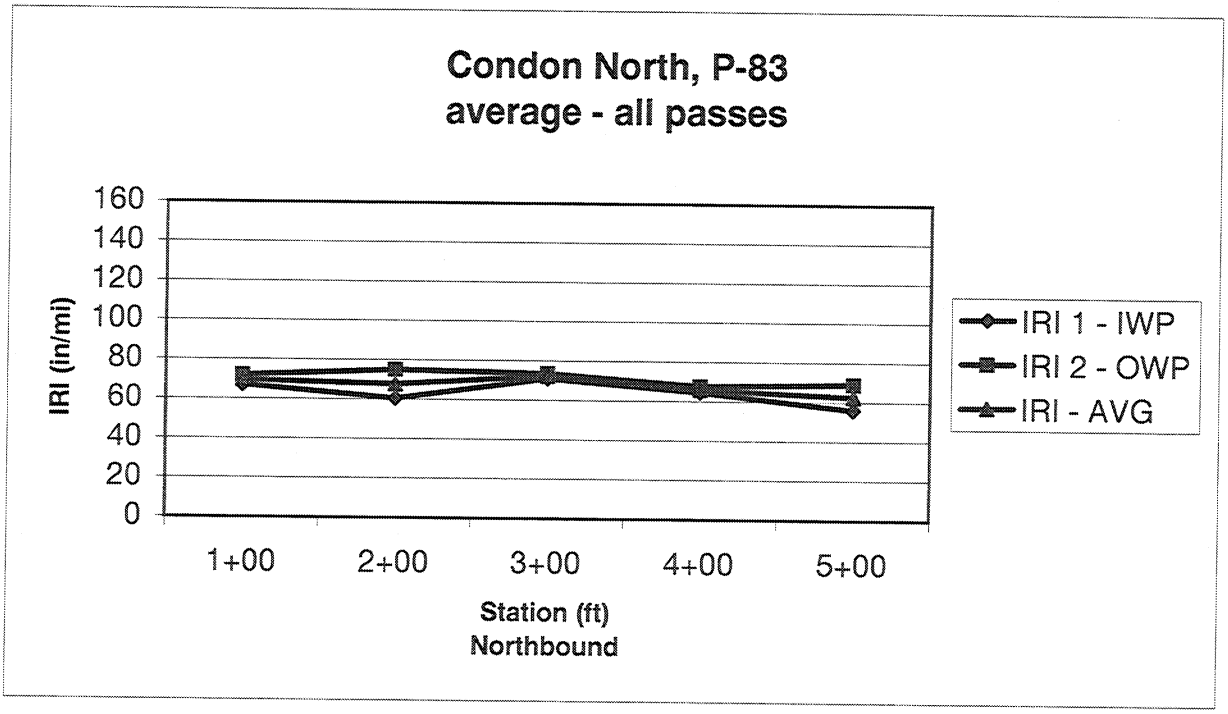
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.18	0.020	57	72	65
2+00	100	200	100	0.16	0.021	62	75	69
3+00	200	300	100	0.16	0.025	70	74	72
4+00	300	400	100	0.20	0.023	66	63	65
5+00	400	500	100	0.18	0.023	54	57	56
AVG.				0.170	0.022	61.8	68.2	65.0
STD.				0.017	0.002	6.496	7.855	6.164



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.11	0.021	77	72	75
2+00	100	200	100	0.13	0.023	59	75	67
3+00	200	300	100	0.15	0.029	72	73	73
4+00	300	400	100	0.20	0.020	63	72	68
5+00	400	500	100	0.18	0.029	58	81	70
AVG.				0.154	0.024	65.8	74.6	70.2
STD.				0.036	0.004	8.349	3.782	3.233



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.15	0.021	67	72	70
2+00	100	200	100	0.15	0.022	61	75	68
3+00	200	300	100	0.16	0.027	71	74	72
4+00	300	400	100	0.20	0.022	65	68	66
5+00	400	500	100	0.18	0.026	56	69	63
AVG.				0.165	0.023	63.8	71.4	67.6
STD.				0.024	0.003	5.794	3.110	3.668



APPENDIX E

HAMMOND

Montana Performance Prediction Models Contract
Field Data Report

Location:	Hammond
Longitude:	105°09' W
Lattitude:	45°19' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	4.7	3.1	3.9	Chip Seal
2	CSB	5.5	7.0	6.3	
3	Base	6.0	4.5	5.3	Orange-Brwn w/Red-Orange Flakes. Sand w/Fine Grvl.
4	Subgrade	-	-	-	Sandy Silty Clay

Materials Sampling

Date: 4/23/02

Material Type	Quantity	Comments
ACP / CSB	14 cores	2-10" & 12-6" cores
CSB	1 bag	ACP/CSB cores
Base	1 bag	
Subgrade	4 shelby, 2bags	1 splitspoon

SHRP-LTPP

SHRP REGION _____ STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING AND FIELD TESTING

LTPP EXPERIMENT Hammond NW ROUTE/HIGHWAY N-23 Lane _____ Direction WB

SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V #1 (b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-23-02 LOCATION STATION: RP95+1 (E. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	4.5"	PMS	
2	10"	CTB	25 blows 10" to 28" Split spoon sample 4.5" - 10"
3	16"	Exist. Base org brn w/red org flakes sand w/fine gravel	
4			
5		Subgrade grg grn sandy silty clg	Sample 16" - 19"
6		More clayey	2' SHELBY (19" - 43") Recovered (17.5")
7		and more plastic w/depth	
8			2' SHELBY (15.25") (43" - 67")
9		grg grn highly plast clg	Recovered (15.25")
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Hammond NW ROUTE/HIGHWAY N-23 AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section _____ (b) After Section ✓#2 Lane _____ Direction WB FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4 - 23 - 02 LOCATION STATION: RP 95.4 (W. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
12" 1	3"	PMS	
24" 2	10" 7"	CTB	
36" 3	14.5" 4.5"	existing base	Sample 10" - 14.5"
48" 4		ltbrn fine sand Subgrade	SHELBY TUBE
60" 5	38.5"	incr cly	(14.5" - 38.5")
72" 6	62.5"	gry grn sandy silty clay	Recovery (16.5")
7		gry grn stiff highly plastic clay	SHELBY TUBE (38.5" - 62.5") Recovery (12")
8			
9			
10			
11			
12			
13		gry grn sand inc clay	
14		gry grn stiff plastic clay	
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): _____ DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
____-____-19__
Date

Project No. 8021 Control No.

Project Name RESERCH PROJ Sta.: HAMMOND

Core Log. No. CL-3-21-02 Hole No. 1

Driller MAYBERRY Crew JOHN SAM Geotech GREG/WINGO

Date 4/23/02 Drill SIMCO Shelbys 2 # Bag Samples

Drilling Method - Augers 8" Casing /Size /Bit FLR

Elev. Water Level — Pipe Installed

Comments:

	SPT/SHELBYS	PSI	RATE
0.0-- ASPHALT 0.6			
CEMENT BASE 0.10"	SS 10"-28"	25 BLOWES	
LT BROWN SILTY	19" SHELBY 2'	43.	
FINE SAND 4.0	43" SHELBY 0'	67"	
BROWN CLAY W/S	DRILLED TO 20.		
FINE SAND		NO SAMP	
20.0 BOH			
S			

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: HAMOND

Core Log. No. CL-3-22-02 Hole No. 2

Driller MAYBERRY Crew JOHN-SAM Geotech GREG & WINSON

Date 4/23/02 Drill Simco Shelbys 2 # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FGR

Elev. _____ Water Level ✓ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 0.3	SPT/SHELBYS	PSI	RATE
CEMENT BASE 0.7	10"- 38"	SHELBY	
BROWN FINE SANDY	38"- 62"	SHELBY	
SILT 40. BROWN	DRILLED TO	20.0	
FINE SANDY CLAY	DO	SAMP	
20.0- BOH			

Montana Performance Prediction Models Contract
Field Data Report

Location: Hammond
Longitude: 105°09' W
Lattitude: 45°19' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/23/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	20.5	14.9	50.7
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	6	0	0
	Length (Meters)	22.8	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Hammond
Longitude: 105°09' W
Lattitude: 45°19' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/23/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING	
	(Number)	0
	(Square Meters)	0.0
SURFACE DEFECTS		
11	BLEEDING	
	(Square Meters)	0.0
12	POLISHED AGGREGATE	
	(Square Meters)	0.0
13	RAVELING	
	(Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING	
	(Number)	0
	Length of Affected Pavement (Meters)	0.0
16	OTHER (Describe) Transverse cracks were sealed with some asphalt cement but cracks are now visible again	

Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/23/02

Pavement Temp:

Before_____ After_____

State Assigned ID _____

State Code _____

SHRP Section ID _____

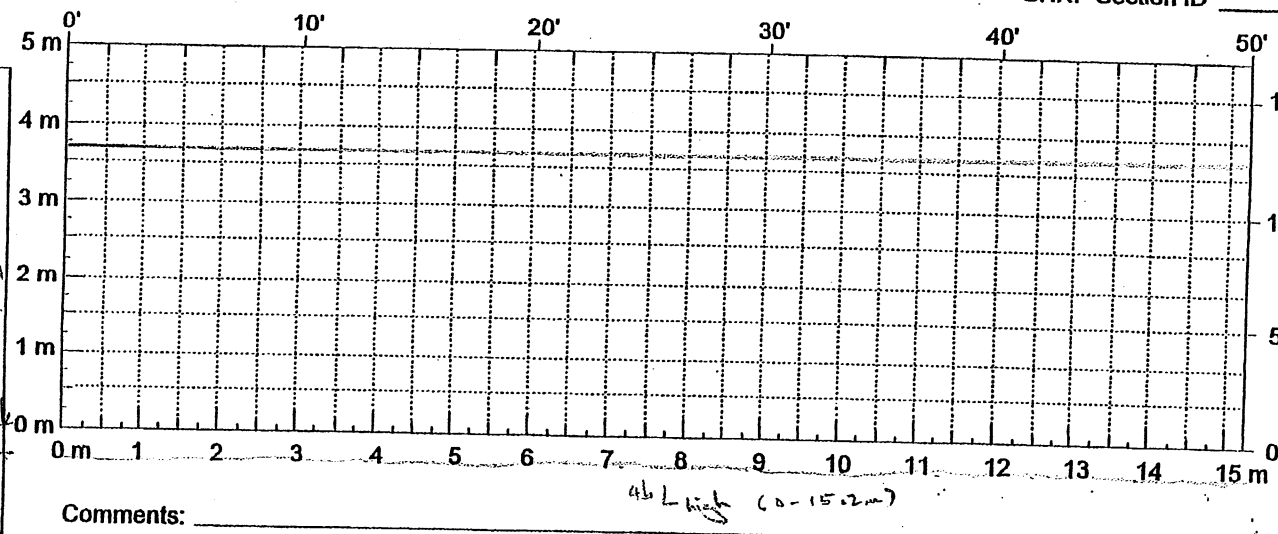
Section Summary

46L = 4.2+0.5+3.2
+5.3+4.3
= 20.5m

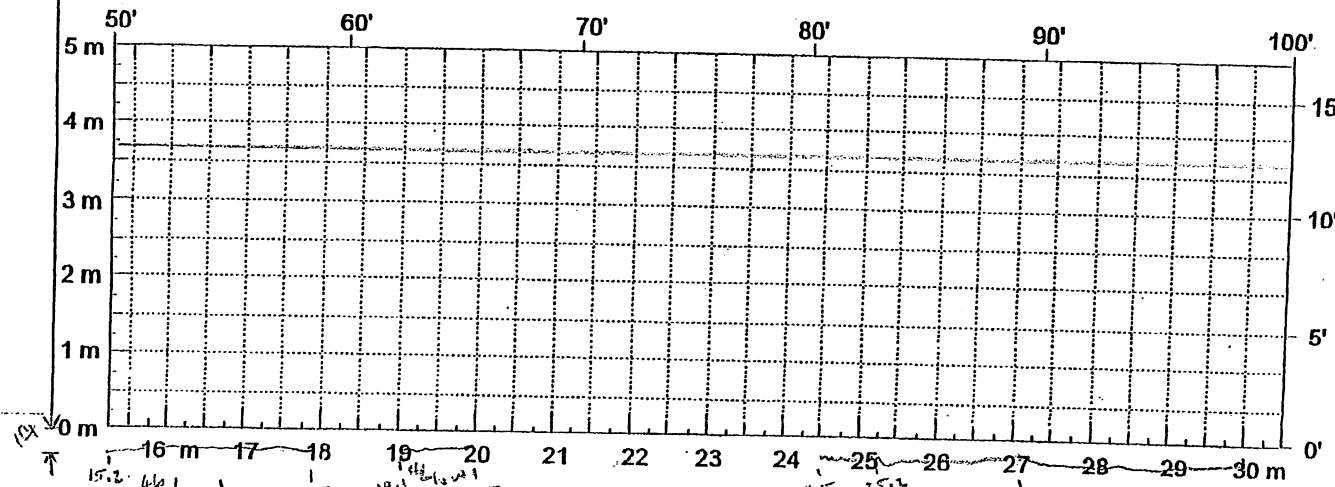
46M = 4.5+1.7+3.4
+5.3
= 14.9 m

46H = 15.2+6.6+11.9
+19.0 = 50.7m

6L = 3.7 (1)
3.7 (2)
3.7 (3)
3.7 (4)
14.8 m (6) 12.4



Comments: _____



Comments: _____

Sheet Summary

46H = 15.2m

46M = 8.6+1.9
= 4.5m

46L = 0.6+0.7+2.9
= 4.2m

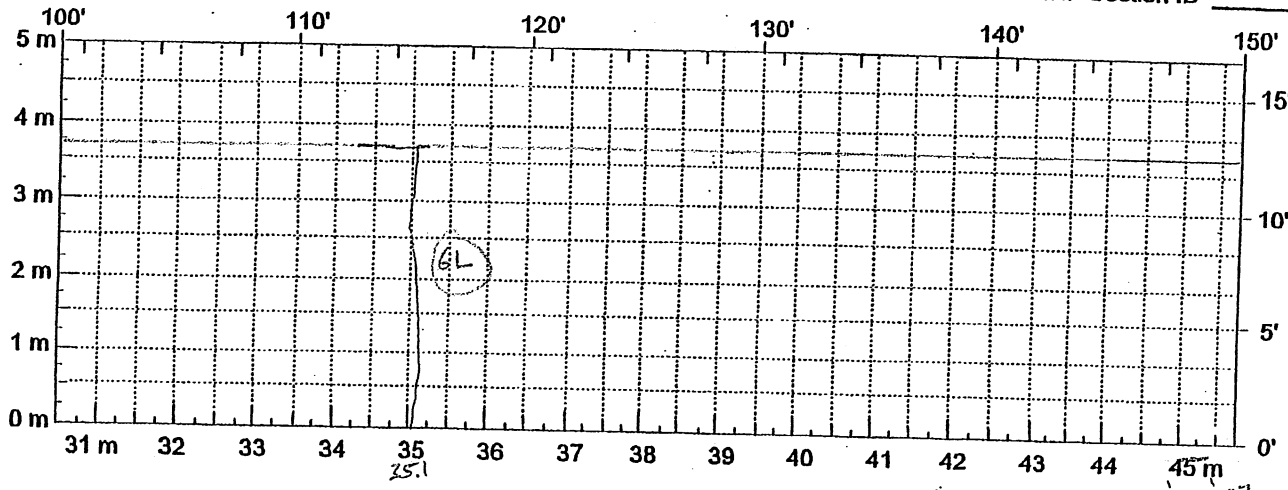
Reviewer: _____ Surveyors: LT / ES

Date: _____ Date: 4/23/02

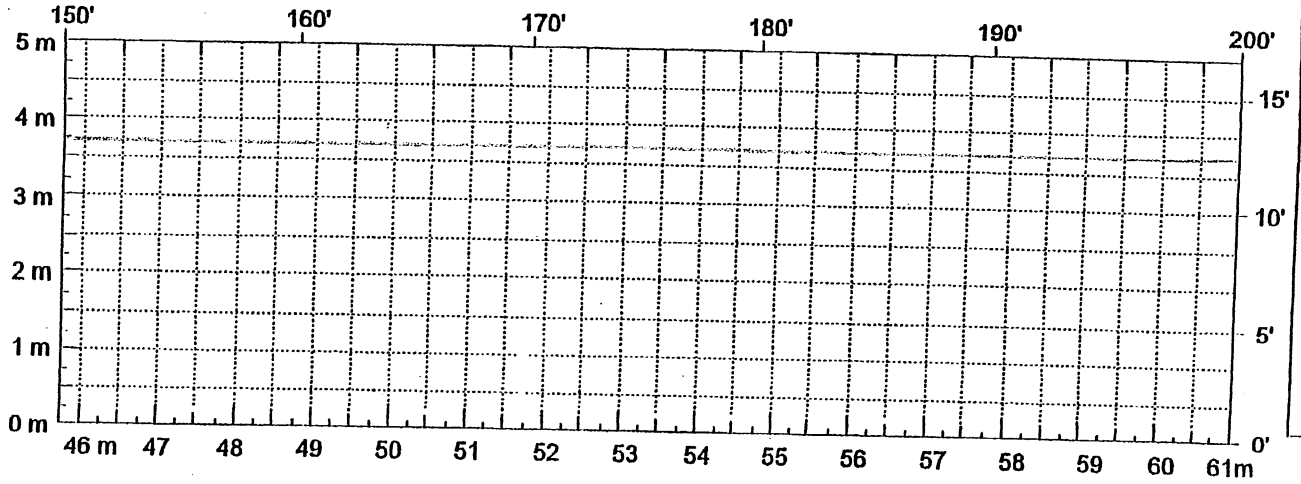
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

4½ = 0.5m

6½ = 1.9m (?)

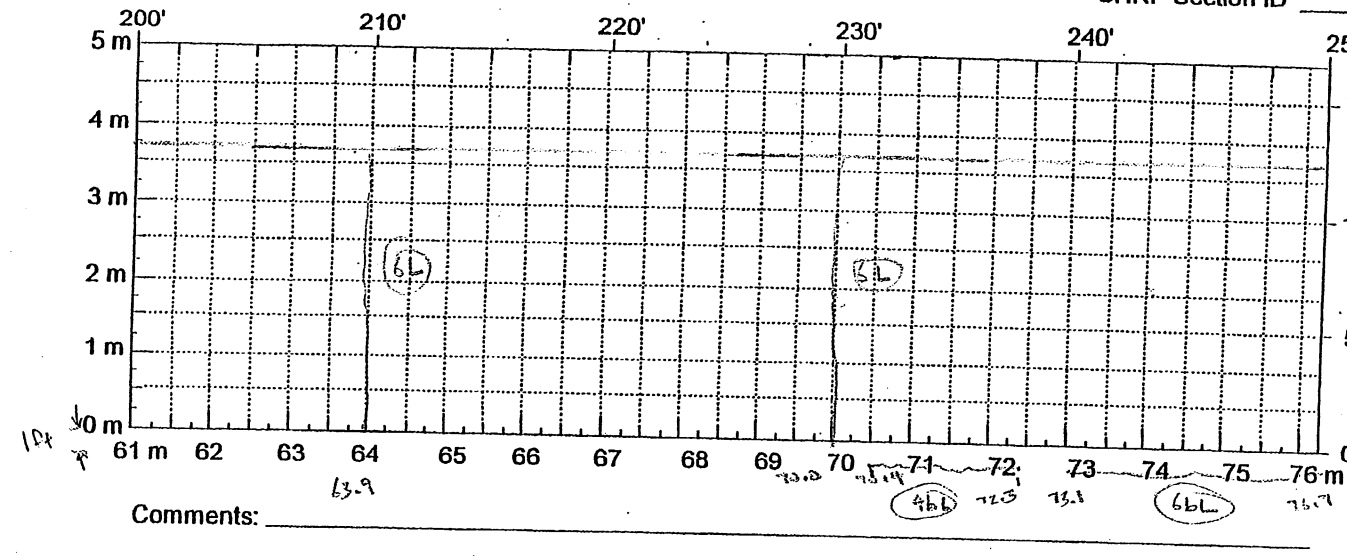
Reviewer: _____ Surveyors: WT / BS

Date: _____ Date: 4/23/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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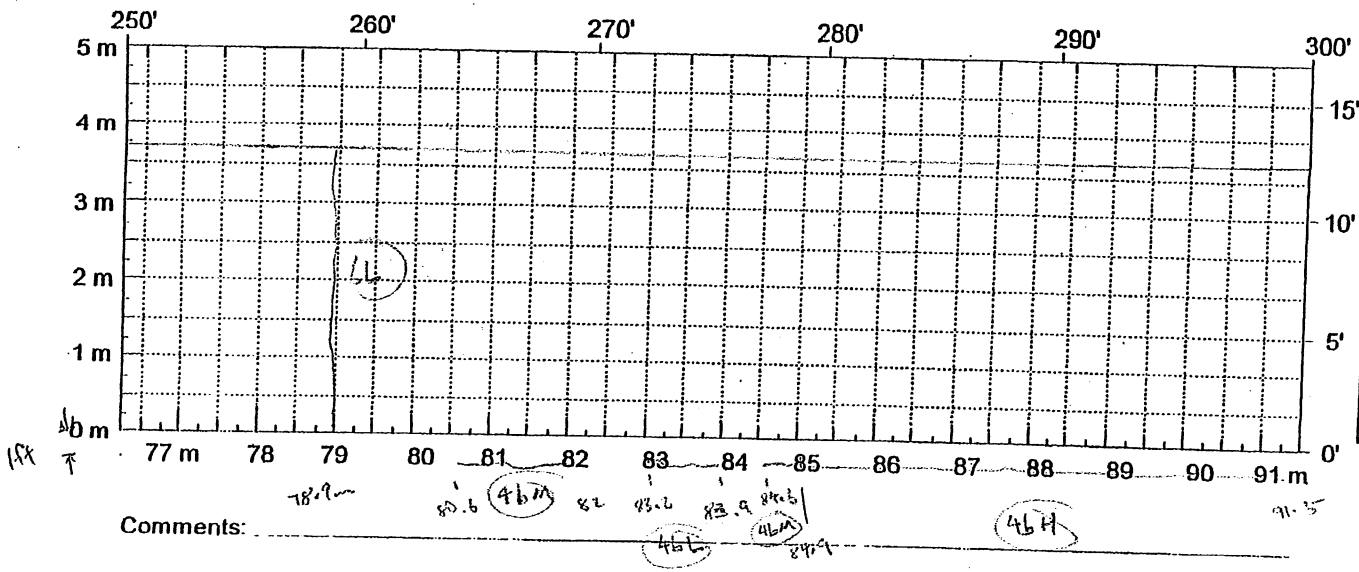


Comments: _____

Sheet Summary

6L = 3.7+3.7+3.7 = 11.1m (3)

46L = 1.9+3.6+1.7 = 7.2m

46M = 1.4+0.3 = 1.7m

46H = 6.6m

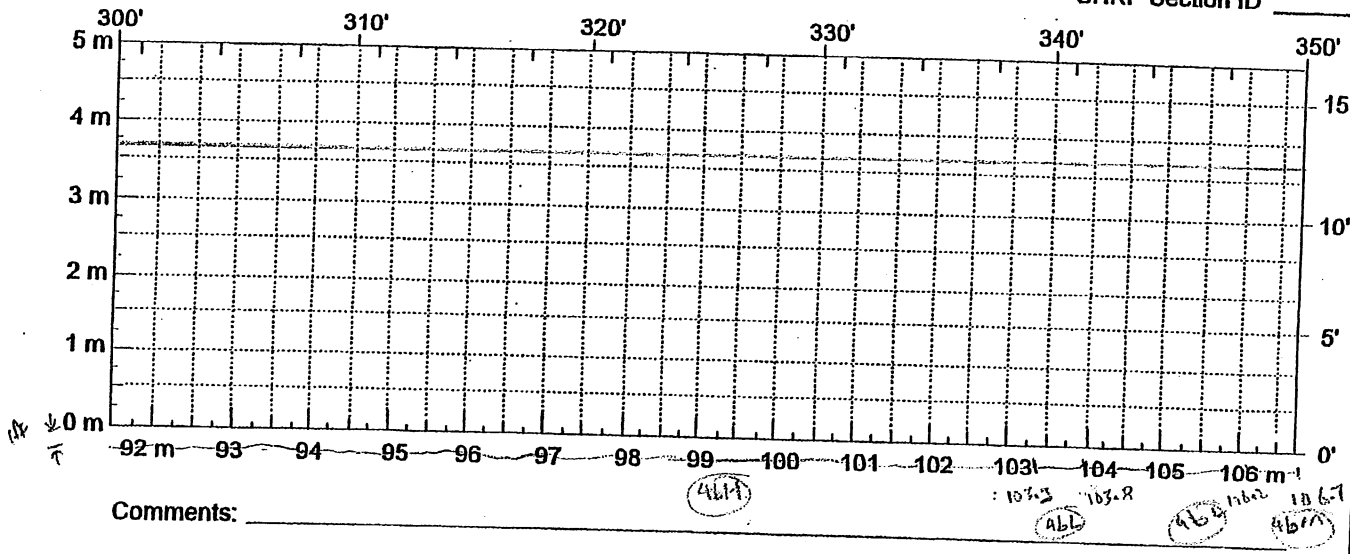
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/23/02

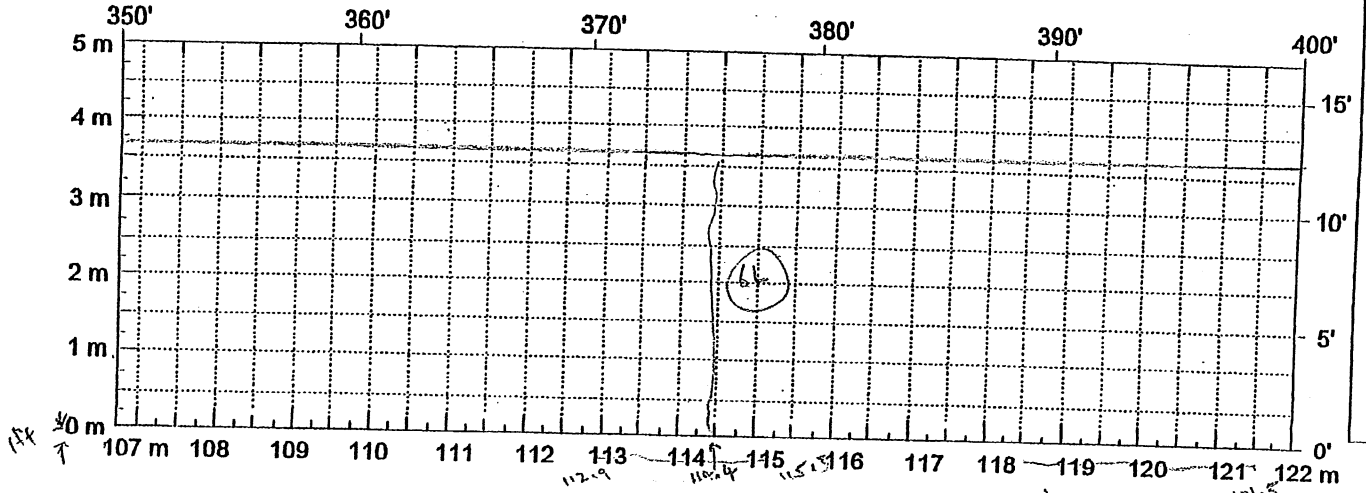
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

46L = 3.7 m

46H = 11.9 m

46M = 0.5 + 2.9 = 3.4 m

46L = 0.5 + 2.9 + 2.4 = 5.8 m

Reviewer: _____ Surveyors: WJ (B)

Date: _____ Date: 4/23/02

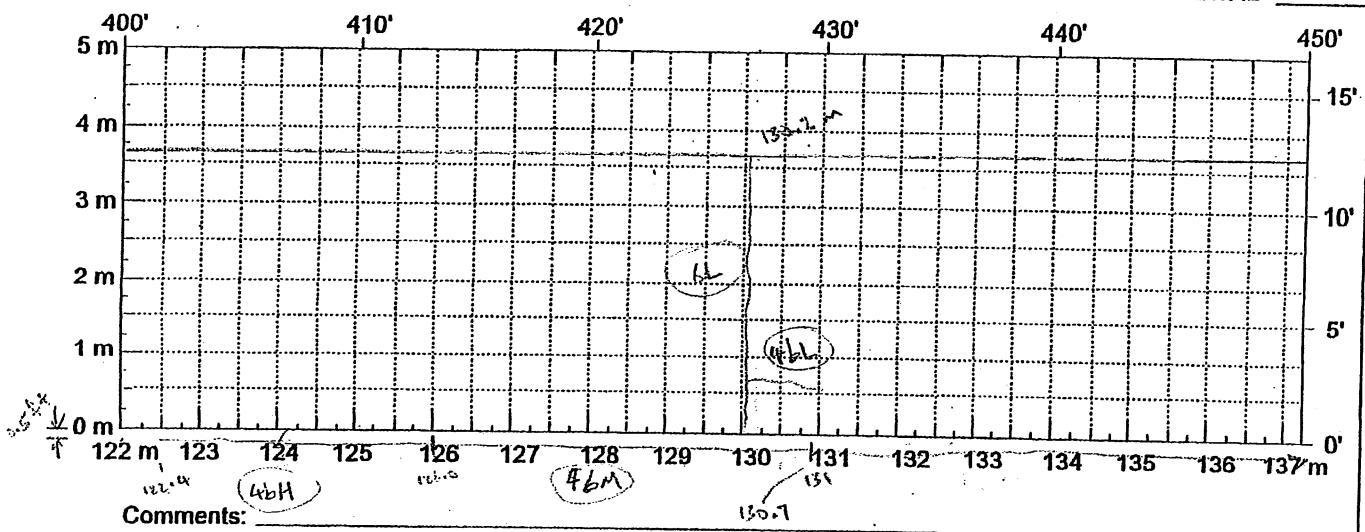
Pavement Temp:

After_____

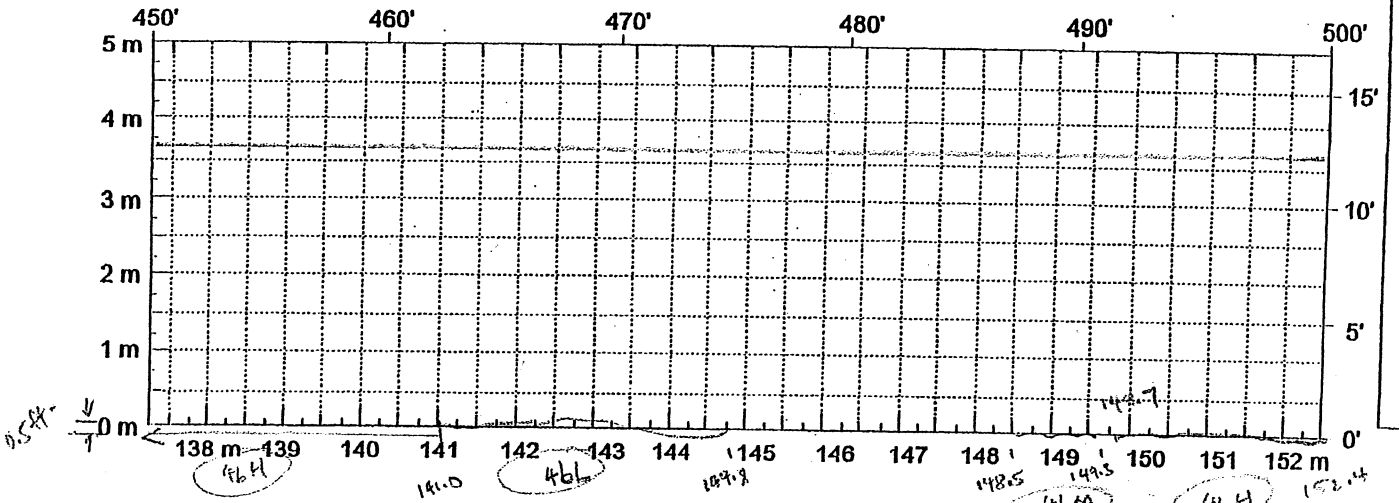
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

6L = 3.7m (1)

46L = 0.5+3.8 = 4.3m

46M = 4.7+0.8 = 5.5m

46H = 3.6+10.3+3.1 = 17.0 m

Montana Performance Prediction Models Contract
Field Data Report

Location: Hammond
Longitude: 105°09' W
Lattitude: 45°19' N

FWD Data

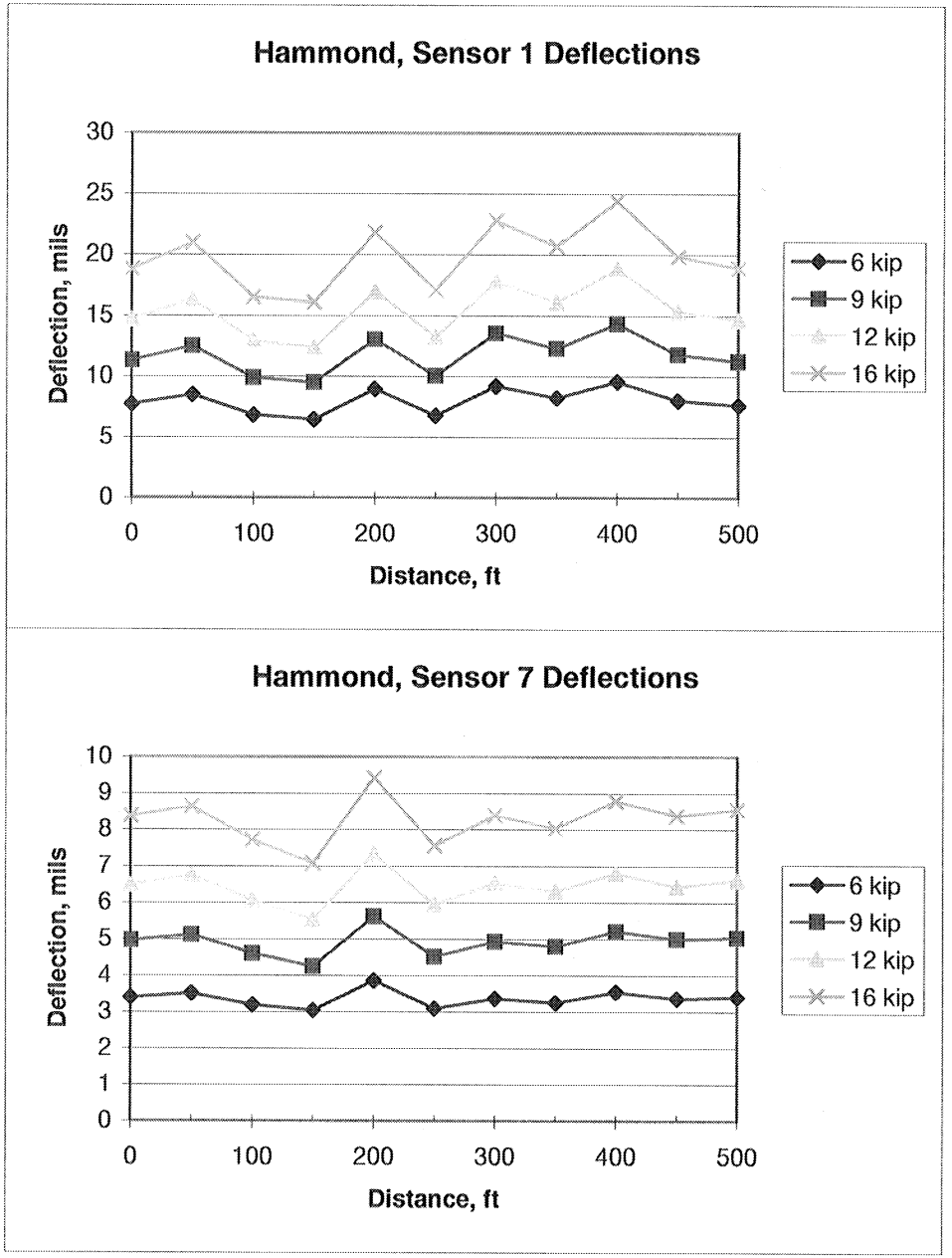
Test Date: 10/9/01

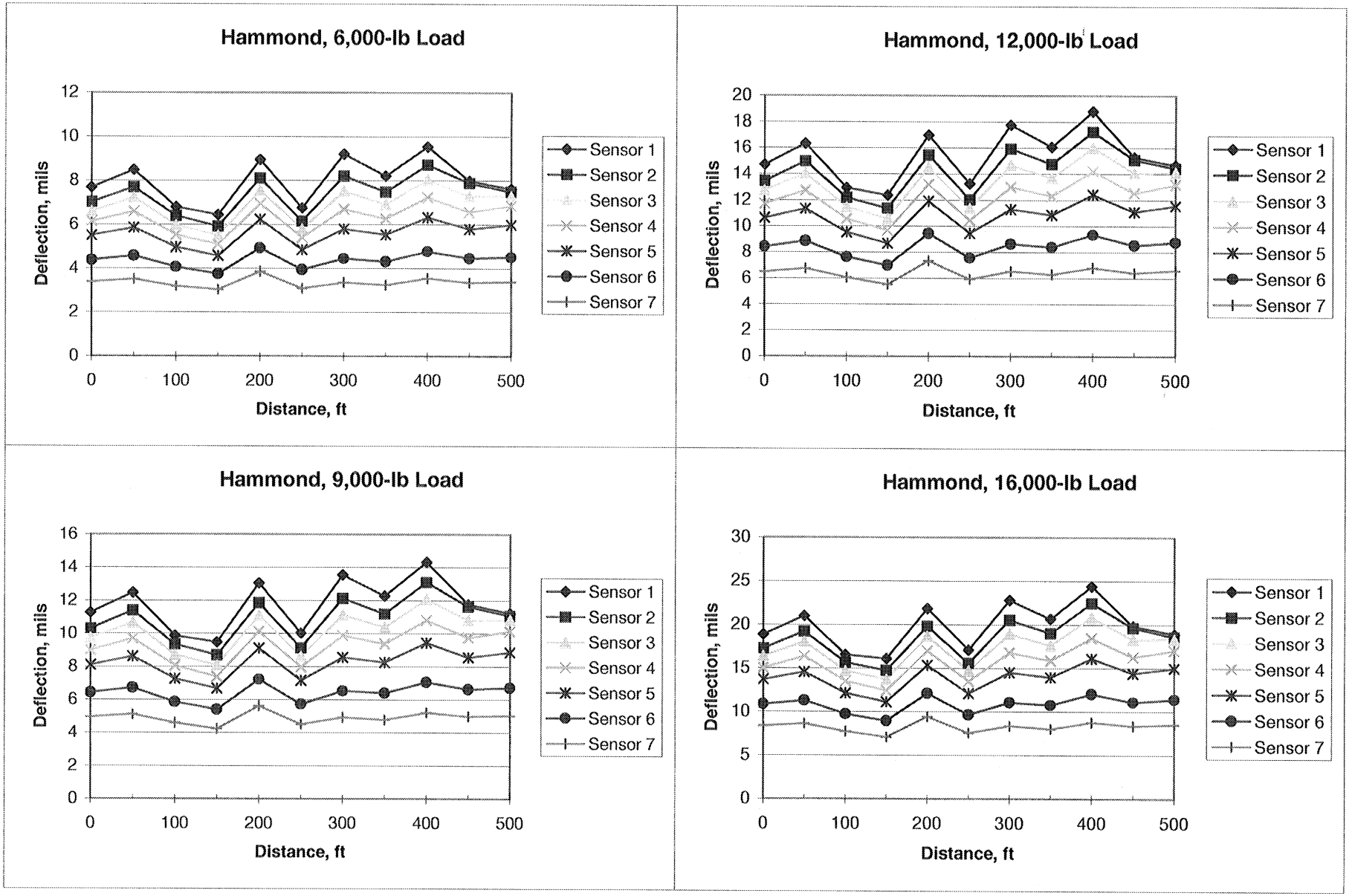
Layer	Material Type	Average Thickness in.
1	ACP	3.9
2	CSB	6.3
3	Base	5.3
4	Subgrade	-

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	6.80	8.71	7.95	7.45	6.95	6.23	4.95	3.84
0+00	9.31	11.67	10.66	10.06	9.29	8.37	6.65	5.12
0+00	11.63	14.24	13.02	12.33	11.33	10.28	8.14	6.29
0+00	14.85	17.49	16.01	15.20	13.94	12.69	10.07	7.77
0+50	6.72	9.49	8.62	8.08	7.37	6.55	5.11	3.93
0+50	9.20	12.75	11.65	10.90	9.91	8.80	6.86	5.22
0+50	11.52	15.66	14.35	13.45	12.21	10.87	8.48	6.47
0+50	14.74	19.35	17.70	16.58	15.05	13.40	10.39	7.95
1+00	6.75	7.64	7.18	6.71	6.21	5.58	4.56	3.58
1+00	9.28	10.18	9.63	8.98	8.30	7.48	6.04	4.74
1+00	11.67	12.57	11.85	11.14	10.24	9.26	7.42	5.88
1+00	15.02	15.52	14.68	13.76	12.67	11.39	9.15	7.24
1+50	6.69	7.17	6.59	6.12	5.67	5.09	4.17	3.38
1+50	9.22	9.70	8.91	8.26	7.55	6.83	5.53	4.34
1+50	11.61	11.96	10.99	10.22	9.35	8.38	6.75	5.34
1+50	14.98	15.05	13.78	12.80	11.65	10.41	8.37	6.63
2+00	6.68	9.95	9.01	8.40	7.72	6.93	5.48	4.29
2+00	9.16	13.27	12.07	11.28	10.29	9.27	7.35	5.71
2+00	11.55	16.34	14.84	13.94	12.69	11.45	9.07	7.06
2+00	14.65	20.00	18.14	17.08	15.53	14.01	11.09	8.63
2+50	6.74	7.58	6.91	6.50	6.06	5.44	4.42	3.47
2+50	9.20	10.25	9.33	8.81	8.14	7.32	5.86	4.61
2+50	11.56	12.75	11.59	10.95	10.05	9.09	7.27	5.71
2+50	14.92	15.94	14.50	13.72	12.57	11.28	9.00	7.05

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	6.67	10.22	9.12	8.35	7.43	6.43	4.94	3.73
3+00	9.11	13.71	12.28	11.26	9.99	8.66	6.61	4.98
3+00	11.47	16.97	15.21	14.00	12.41	10.79	8.25	6.23
3+00	14.67	20.89	18.82	17.32	15.39	13.30	10.15	7.68
3+50	6.68	9.13	8.32	7.69	6.96	6.15	4.80	3.61
3+50	9.16	12.49	11.39	10.56	9.53	8.40	6.51	4.87
3+50	11.50	15.40	14.14	13.10	11.78	10.39	8.04	6.03
3+50	14.81	19.14	17.60	16.29	14.68	12.92	9.96	7.43
4+00	6.62	10.52	9.61	8.86	7.98	6.97	5.26	3.91
4+00	9.10	14.48	13.24	12.20	10.93	9.55	7.14	5.26
4+00	11.41	17.87	16.38	15.20	13.50	11.81	8.87	6.46
4+00	14.67	22.38	20.60	19.07	16.91	14.77	11.04	8.05
4+50	6.63	8.83	8.70	8.04	7.25	6.40	4.93	3.71
4+50	9.12	11.92	11.80	10.94	9.87	8.67	6.72	5.05
4+50	11.49	14.63	14.44	13.45	11.99	10.61	8.16	6.15
4+50	14.70	18.24	18.05	16.80	14.95	13.25	10.19	7.70
5+00	6.70	8.51	8.36	8.14	7.65	6.68	5.04	3.80
5+00	9.16	11.43	11.28	11.04	10.31	9.03	6.83	5.12
5+00	11.55	14.11	13.88	13.60	12.69	11.13	8.43	6.36
5+00	14.75	17.43	17.13	16.91	15.66	13.82	10.52	7.88

FWD Deflections




Hammond, 6,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7
Hammond, 12,000-lb Load
Deflection, mils
Distance, ft
Hammond, 9,000-lb Load
Deflection, mils
Distance, ft
Hammond, 16,000-lb Load
Deflection, mils
Distance, ft

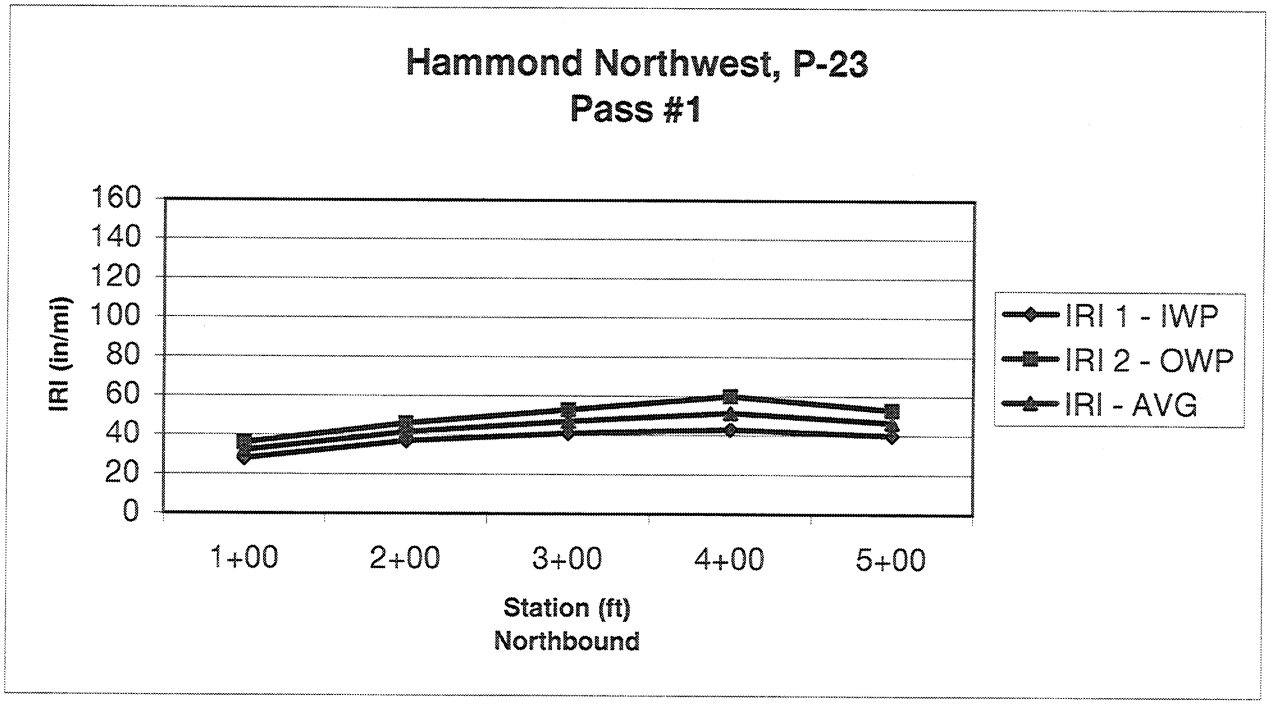
Montana Performance Prediction Models Contract
Field Data Report

Location: Hammond
Longitude: 105°09' W
Lattitude: 45°19' N

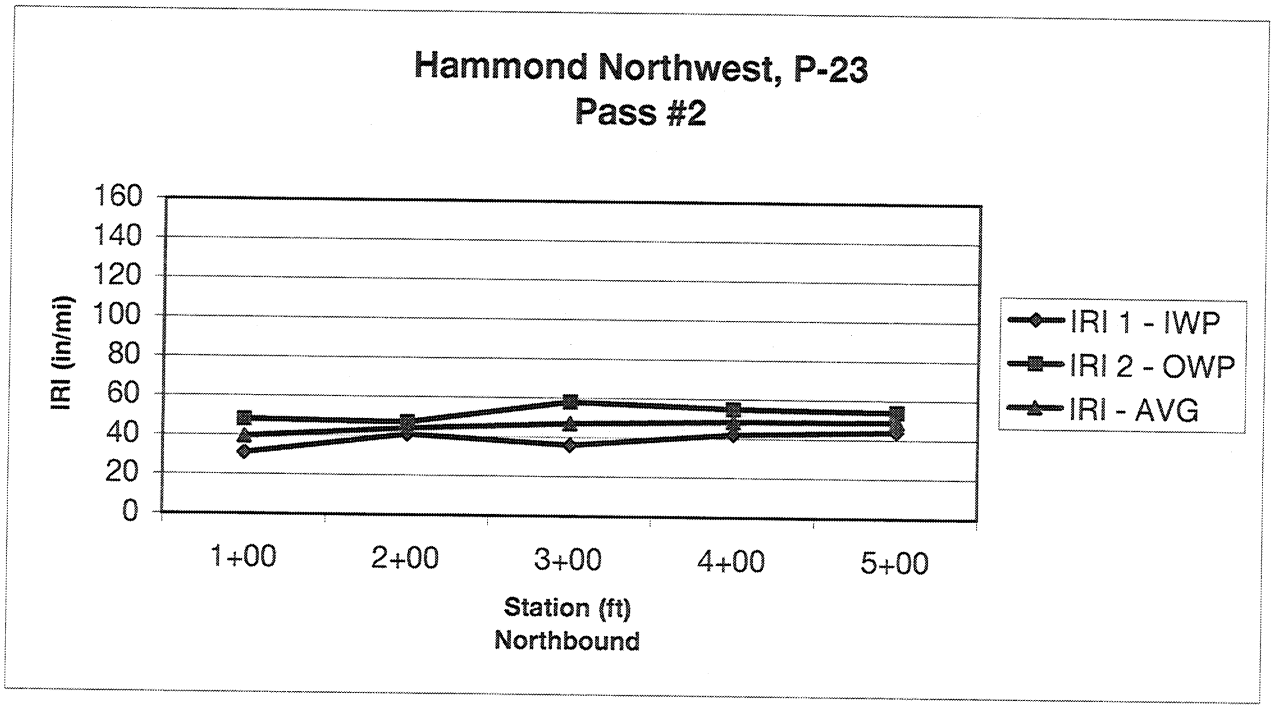
Profile Data

Test Date: 9/28/01

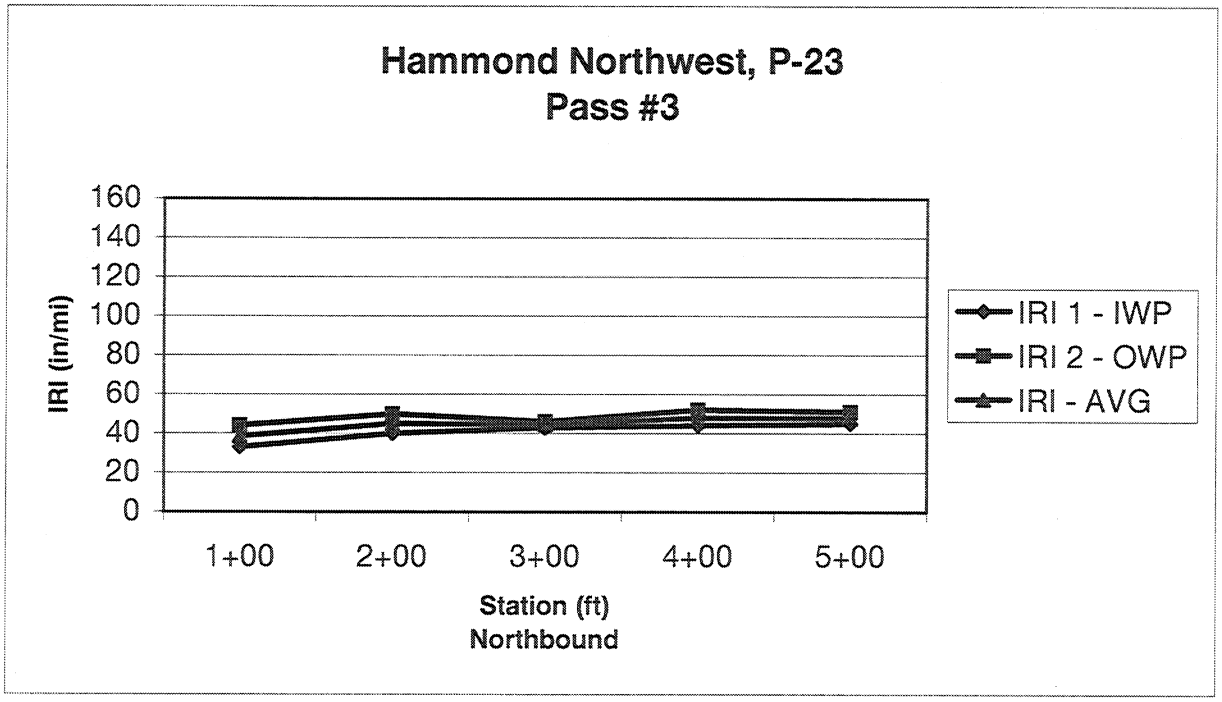
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.08	0.034	28	36	32
2+00	100	200	100	0.13	0.020	37	46	42
3+00	200	300	100	0.09	0.033	41	53	47
4+00	300	400	100	0.04	0.017	43	60	52
5+00	400	500	100	0.10	0.020	40	53	47
AVG.				0.088	0.025	37.8	49.6	43.7
STD.				0.033	0.008	5.891	9.072	7.438



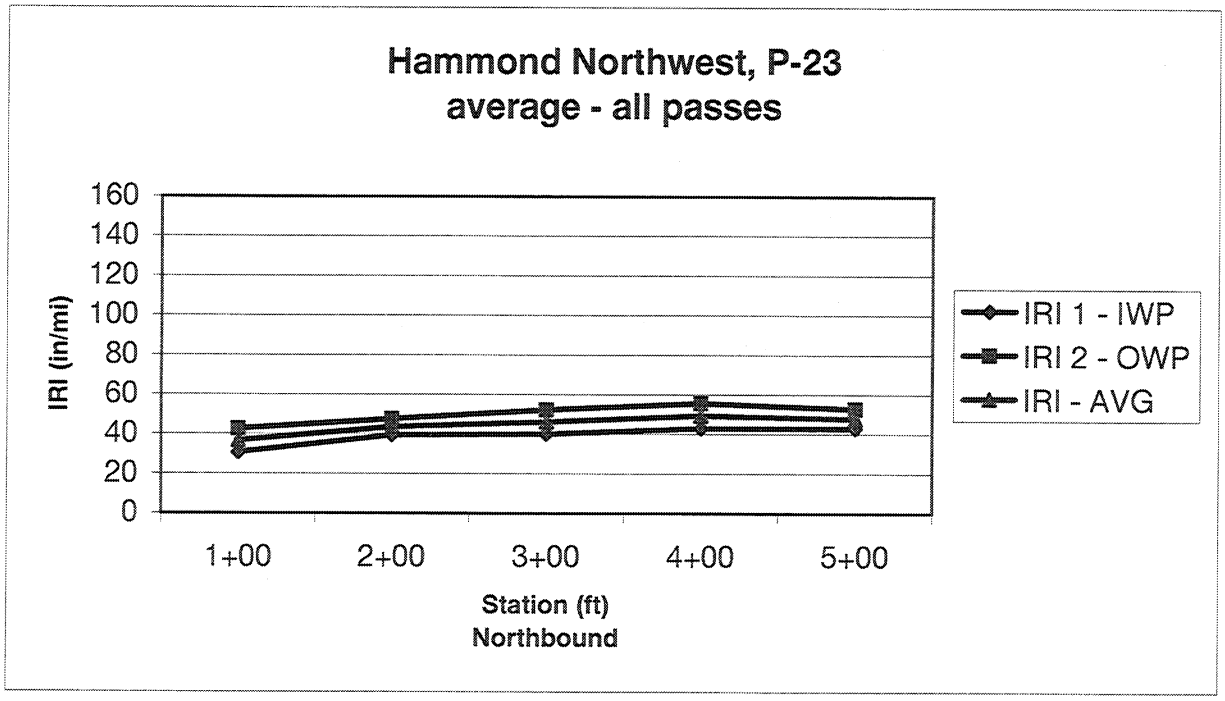
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.13	0.021	31	48	40
2+00	100	200	100	0.14	0.017	41	47	44
3+00	200	300	100	0.11	0.024	36	58	47
4+00	300	400	100	0.09	0.018	42	55	49
5+00	400	500	100	0.11	0.021	44	54	49
AVG.				0.116	0.020	38.8	52.4	45.6
STD.				0.019	0.003	5.263	4.722	3.927



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.13	0.025	33	44	39
2+00	100	200	100	0.11	0.018	40	50	45
3+00	200	300	100	0.07	0.018	43	46	45
4+00	300	400	100	0.08	0.018	44	52	48
5+00	400	500	100	0.07	0.027	45	51	48
AVG.				0.092	0.021	41.0	48.6	44.8
STD.				0.027	0.004	4.848	3.435	3.883



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.11	0.027	31	43	37
2+00	100	200	100	0.13	0.018	39	48	44
3+00	200	300	100	0.09	0.025	40	52	46
4+00	300	400	100	0.07	0.018	43	56	49
5+00	400	500	100	0.09	0.023	43	53	48
AVG.				0.099	0.022	39.2	50.2	44.7
STD.				0.022	0.004	5.059	5.091	4.985



APPENDIX F

WOLF POINT

Montana Performance Prediction Models Contract
Field Data Report

Location:	Wolf Point
Longitude:	105°31' W
Lattitude:	47°57' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	3.7	3.7	3.7	Chip Seal
2	CTB	19.8	19.8	19.8	
3	Subgrade	-	-	-	Dark Brwn-Blk Stiff Highly Plastic Clay w/ Scatt. Grvl.

Materials Sampling

Date: 4/24/02

Material Type	Quantity	Comments
ACP/CTB	14 cores	2-10" & 12-6" cores
CTB	2 bags	ACP/CTB cores
Subgrade	4 shelby, 3bags	1 TBD, 1 split spoon

SHRP-LTPP

SHRP REGION _____ FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT SHRP ASSIGNED ID _____

LTPP EXPERIMENT Wolf Pt 5 ROUTE/HIGHWAY P-25 Lane _____ Direction NB

SAMPLE/TEST: (a) Before Section V #1 (b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4 - 24 - 02 LOCATION STATION: RP 37.4 (S. End) AUGER PROBE NUMBER _____ SHEET NUMBER _____ OF _____

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	3.5"	PMS	
2	23.5"	CTB	Sample 3.5" to 23.5"
3		dk brn - blk stiff highly plast. cly w/ scattered gravel	
4			Shelby Tube 23.5" - 47.5" (11" Recov.)
5		Subgrade	
6			
7			Shelby Tube 47.5" - 78.5" (11" Recov.)
8			
9			
10			
11			
12			
13			
14		brn - dk brn stiff highly plastic cly some gravel	
15			
16			
17			
18			
19			
20	Dry to T.D.		

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ____-____-19__
Date

SHRP REGION _____ SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT SHRP ASSIGNED ID _____

LTPP EXPERIMENT Wolf Pt 3 ROUTE/HIGHWAY P-25 Lane _____ Direction N/B

SAMPLE/TEST: (a) Before Section _____ (b) After Section ✓ #2 FIELD SET NO. _____

LOG OF SHOULDER PROBE DCG SHEET: 08

OPERATOR Dan. M EQUIPMENT USED _____ SHEET NUMBER _____ OF _____

AUGERING DATE 6-24-02 LOCATION STATION: RP 37.4 (N. End) AUGER PROBE NUMBER _____

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	3 6/8"	PMS	
2	8.5" (Recov)	CTB	Sample 12.25 to 20.5"
3	23.5"	dk brn stiff gravelly clay w/ Sub grade dk brn - blk stiff highly plastic clay some gravel	
4			Split spoon 23.5" – 41.5" 12 blows 18" (11.5 Recov)
5			
6			
7			
8		blk plast. clay	Shelby Tube 42.5" – 66.5" (15.25" Recov)
9			
10		brn vf inc sand - silt	
11			Shelby Tube 66.5" – 90.5" (15" Recov) loose mat'l on Top
12		dk brn clayey gravel	
13		dk brn highly plast clay	
14			
15			
16			
17		org brn clayey gravel	
18			
19			
20	Dry to TD		

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ___-___-19__
Date

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: WOLF POINT

Core Log. No. CL-3-23-02 Hole No. 1

Driller MAYBERRY Crew JOHN - SAM Geotech GREG - WINDOW

Date 4/24/02 Drill SIMCO Shelbys 2 # Bag Samples _____

Drilling Method - Augers 8' Casing _____ /Size _____ /Bit FGR

Elev. _____ Water Level ✓ Pipe Installed _____

Comments:

0.0-- ASPHALT . 08	SPT/SHELBYS	PSI	RATE
GRAVEL BR SILTY	SS 22.5 - 40.5	12 BLOWS	
GRAVEL 2.5	22.5 - 40.5	BAG	
DK BROWN CLAY	42.5 - 66.5	SHELBY	
16.5 BROWN	66.5 - 90.5	SEALY	
FINE SAND W/S	DRILLED TO 20'		
PEA GRAVEL	NO SAMPLES		
20.0			
BOH			

Project No. 8021 Control No. _____

Project Name RESEARCH Proj Sta.: WOLF POINT

Core Log. No. CL-5-24-02 Hole No. 2

Driller MAYBERRY Crew JOHN - SAM Geotech GREG - WINDOW

Date 4/24/02 Drill SIMCO Shelbys 2 # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FBR

Elev. _____ Water Level ✓ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 0.5	SPT/SHELBYS	PSI	RATE
A CEMENT BASE 2.5"	0.5 - 2.5	BAG	
DK BROWN CLAY	2.25 - 4.5	SHELBY	
W/S PEA GRAVEL	4.5 - 70.5"	SHELBY	
20.0 BOH	DRILLED TO 20		
		NO SAMP.	

Montana Performance Prediction Models Contract
Field Data Report

Location: Wolf Point
Longitude: 105°31' W
Lattitude: 47°57' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/24/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	13	0	0
	Length (Meters)	45.2	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION (Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes (Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Wolf Point
Longitude: 105°31' W
Lattitude: 47°57' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/15/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL
		N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING	
	(Number)	0
	(Square Meters)	0.0
SURFACE DEFECTS		
11	BLEEDING	
	(Square Meters)	0.0
12	POLISHED AGGREGATE	
	(Square Meters)	0.0
13	RAVELING	
	(Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING	
	(Number)	0
	Length of Affected Pavement (Meters)	0.0
16	OTHER (Describe)	

Reviewer: _____ Surveyors: WT | BS

Date: _____ Date: 4/24/12

Pavement Temp:

Before_____ After_____

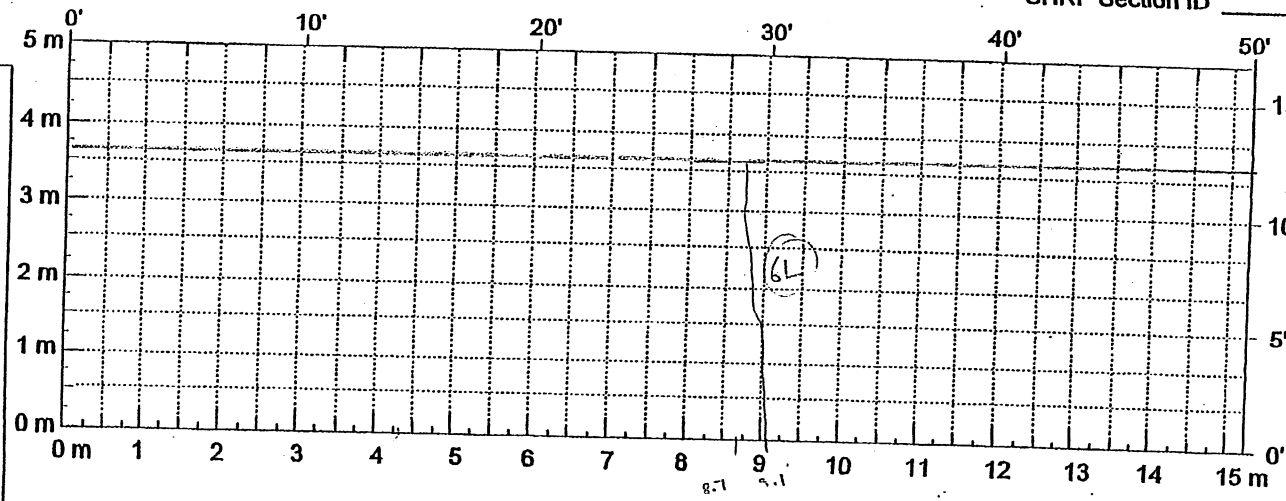
State Assigned ID _____

State Code _____

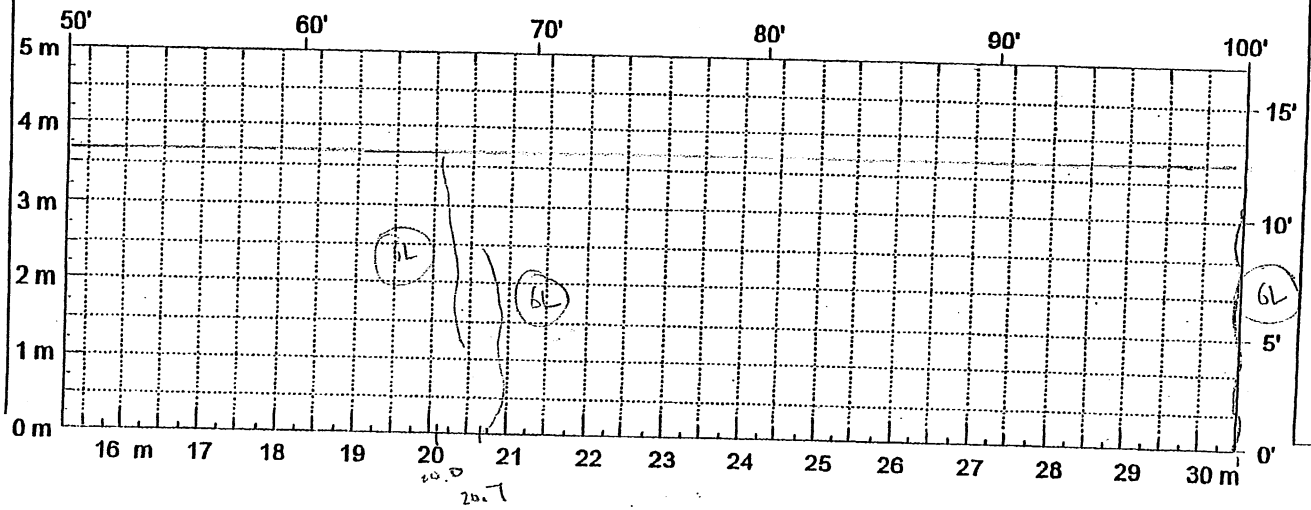
SHRP Section ID _____

Section Summary

GL = 12.28 (4)
3.66 (1)
10.98 (3)
10.98 (3)
9.32 (2)
45.22 (13)



Comments: _____



Comments: _____

Sheet Summary

GL = 3.66 + 10.98 + 10.98 + 9.32 = 3.66
= 12.28 (4)

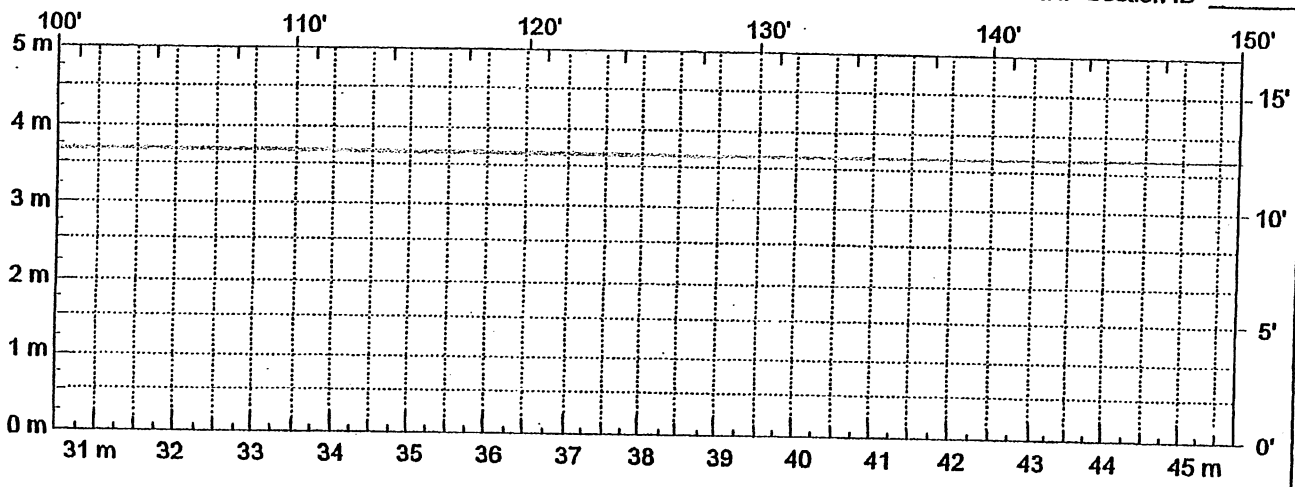
Reviewer: _____ Surveyors: WT / BS

Date: _____ Date: 4/24/02

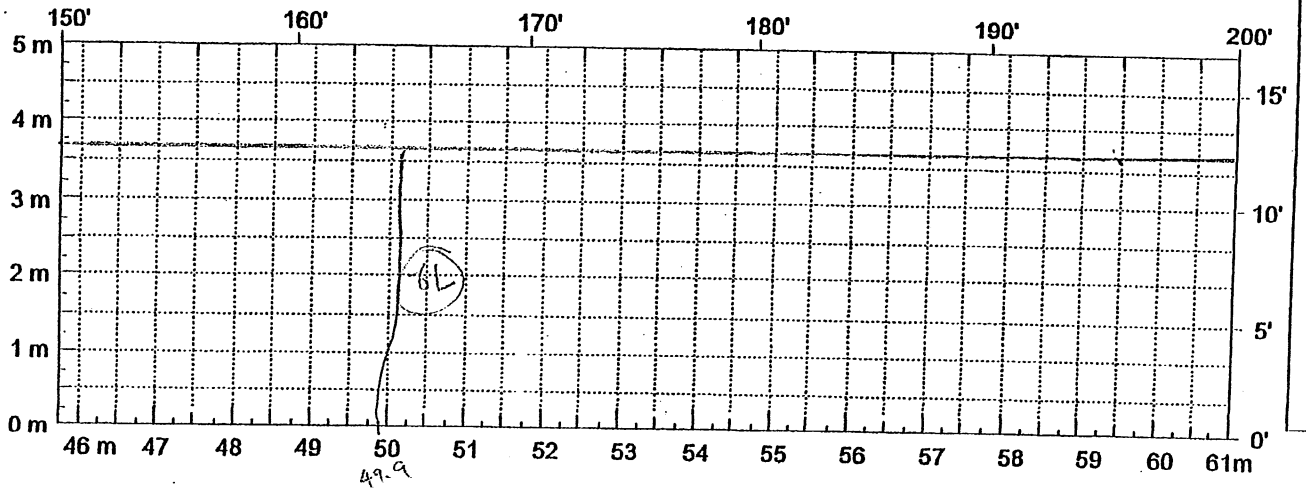
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

GL = Sta (-)

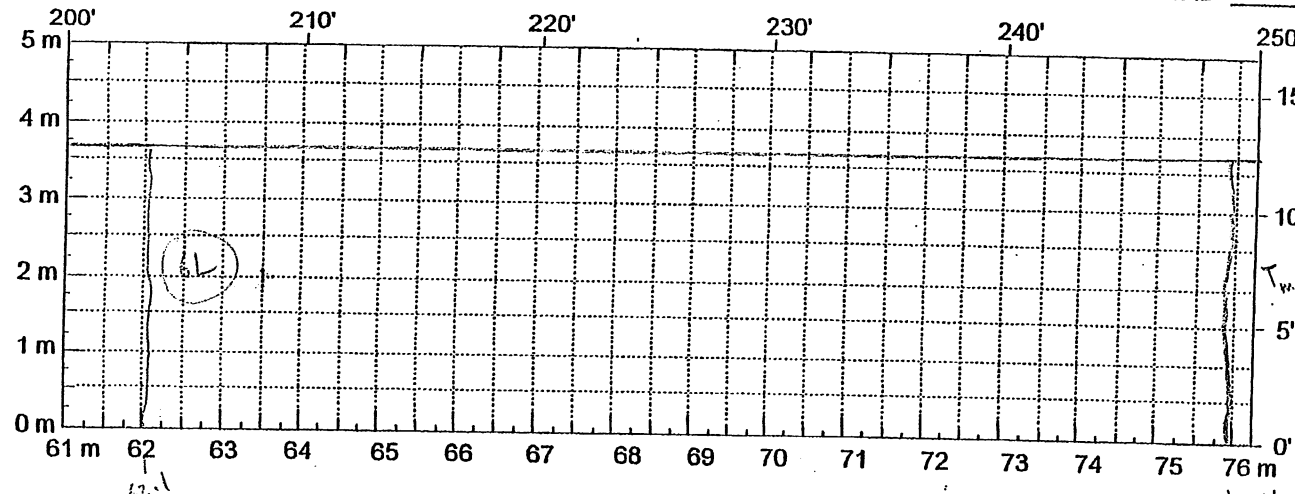
Reviewer: _____ Surveyors: IST | BS

Date: _____ Date: 4/29/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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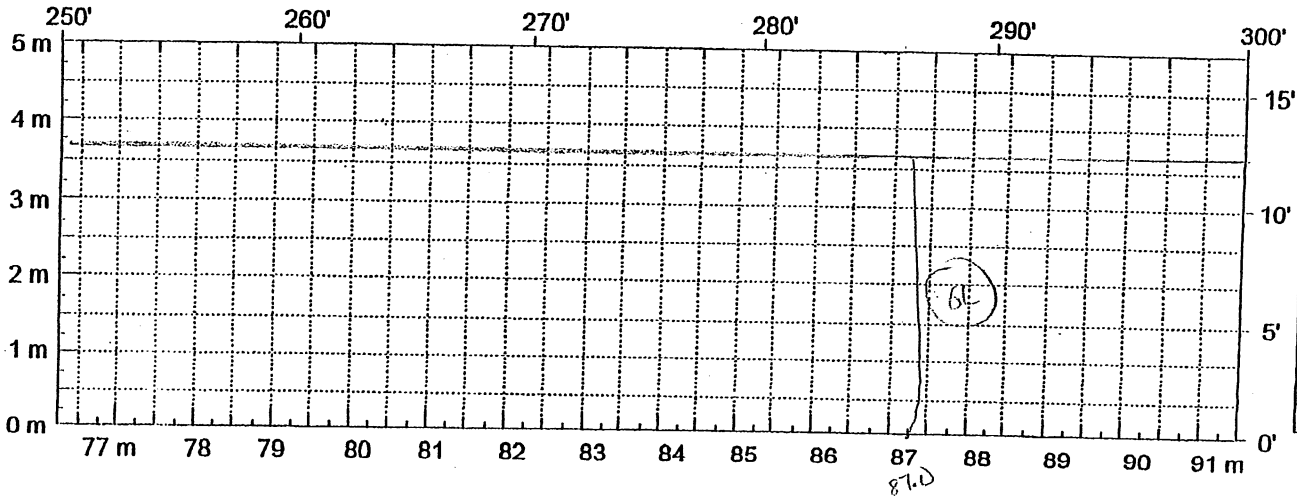
Comments: _____



Comments: _____

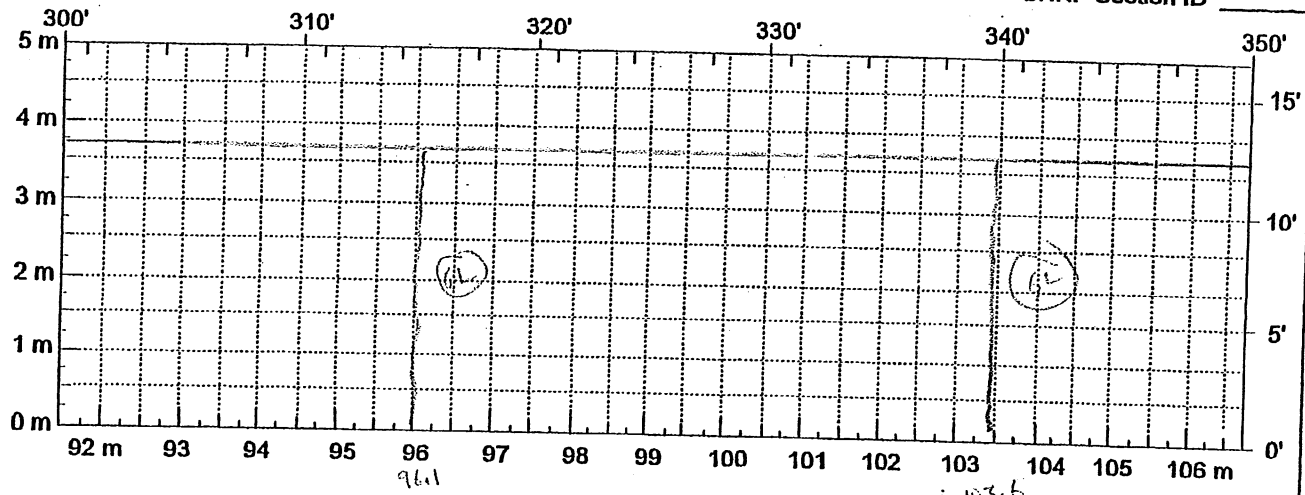
Reviewer: _____ Surveyors: KT | BS

Date: _____ Date: 4/24/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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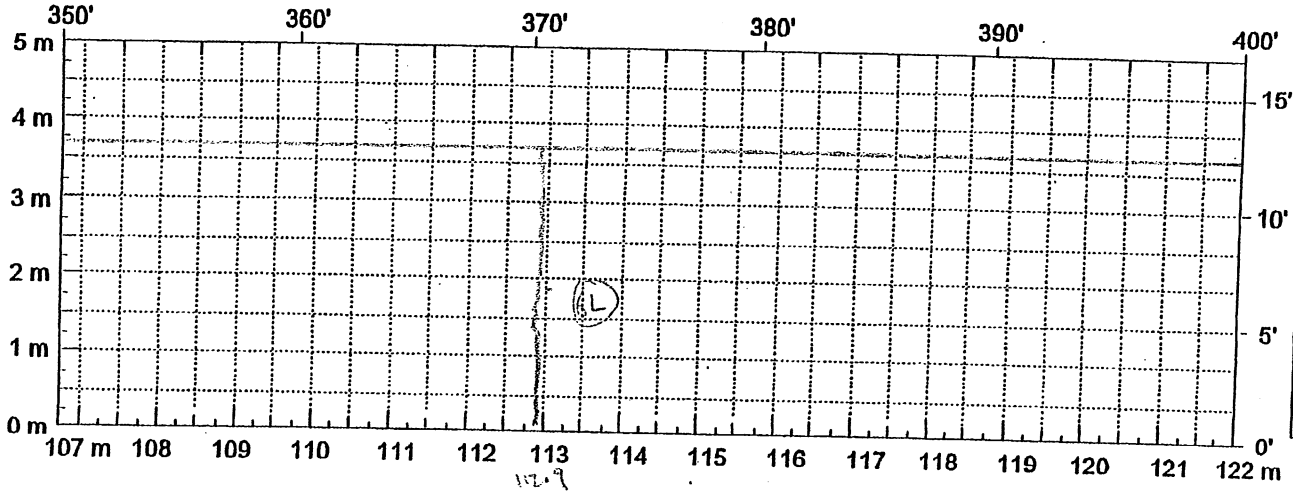


Comments: _____

Sheet Summary

$\bar{x} = 3663.66 \pm 3.6$

$= 10.98$ (3)

Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 4/24/92

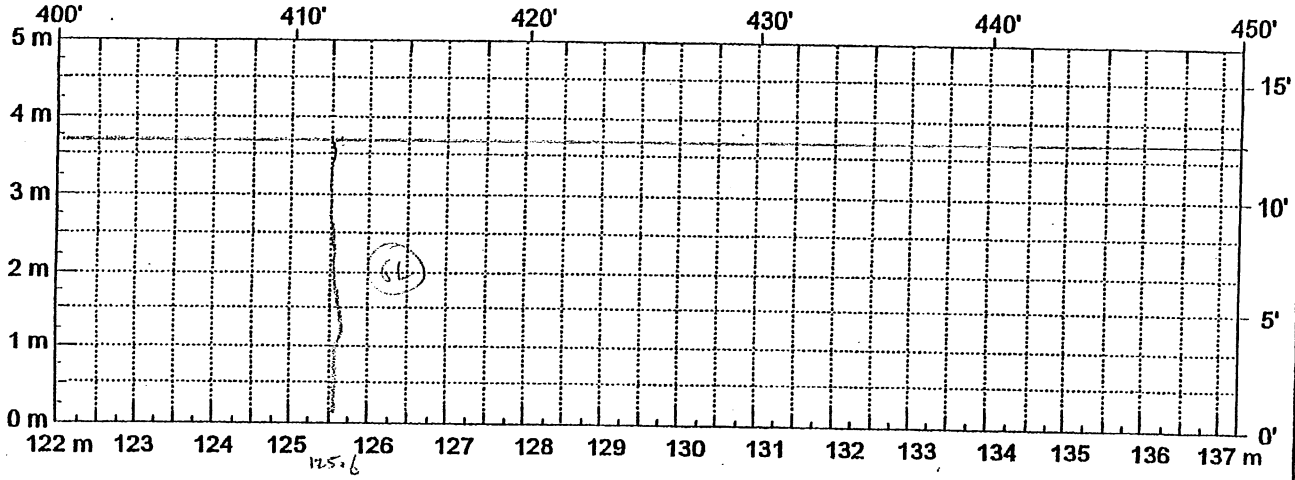
Pavement Temp:

After_____

State Assigned ID _____

State Code _____

SHRP Section ID _____



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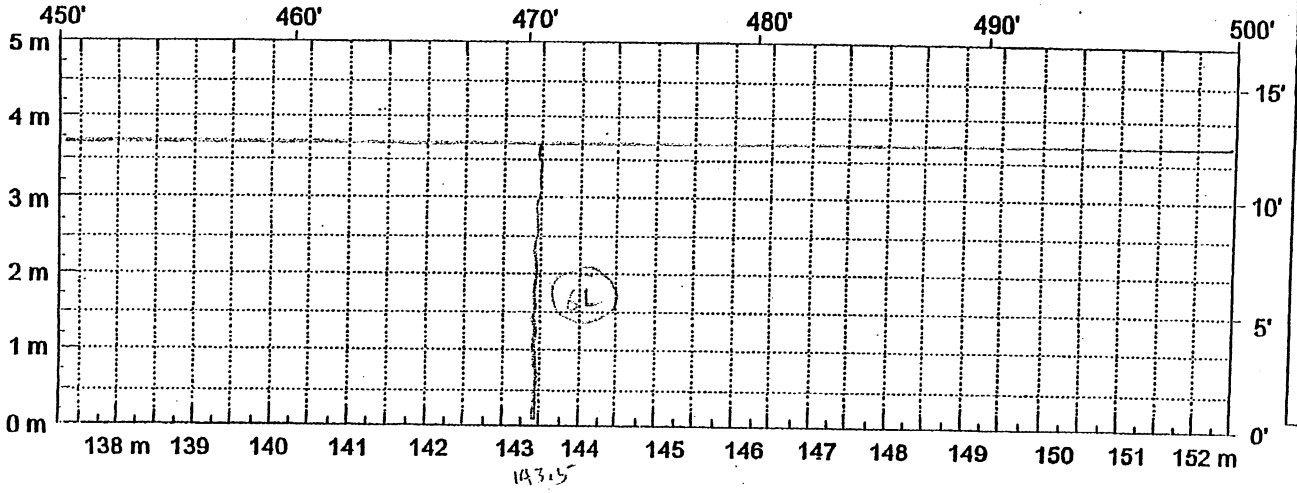


Comments: _____

Sheet Summary

GL = 3.68 + 3.54
= 7.32 (2)

Montana Performance Prediction Models Contract
Field Data Report

Location: Wolf Point
Longitude: 105°31' W
Lattitude: 47°57' N

FWD Data

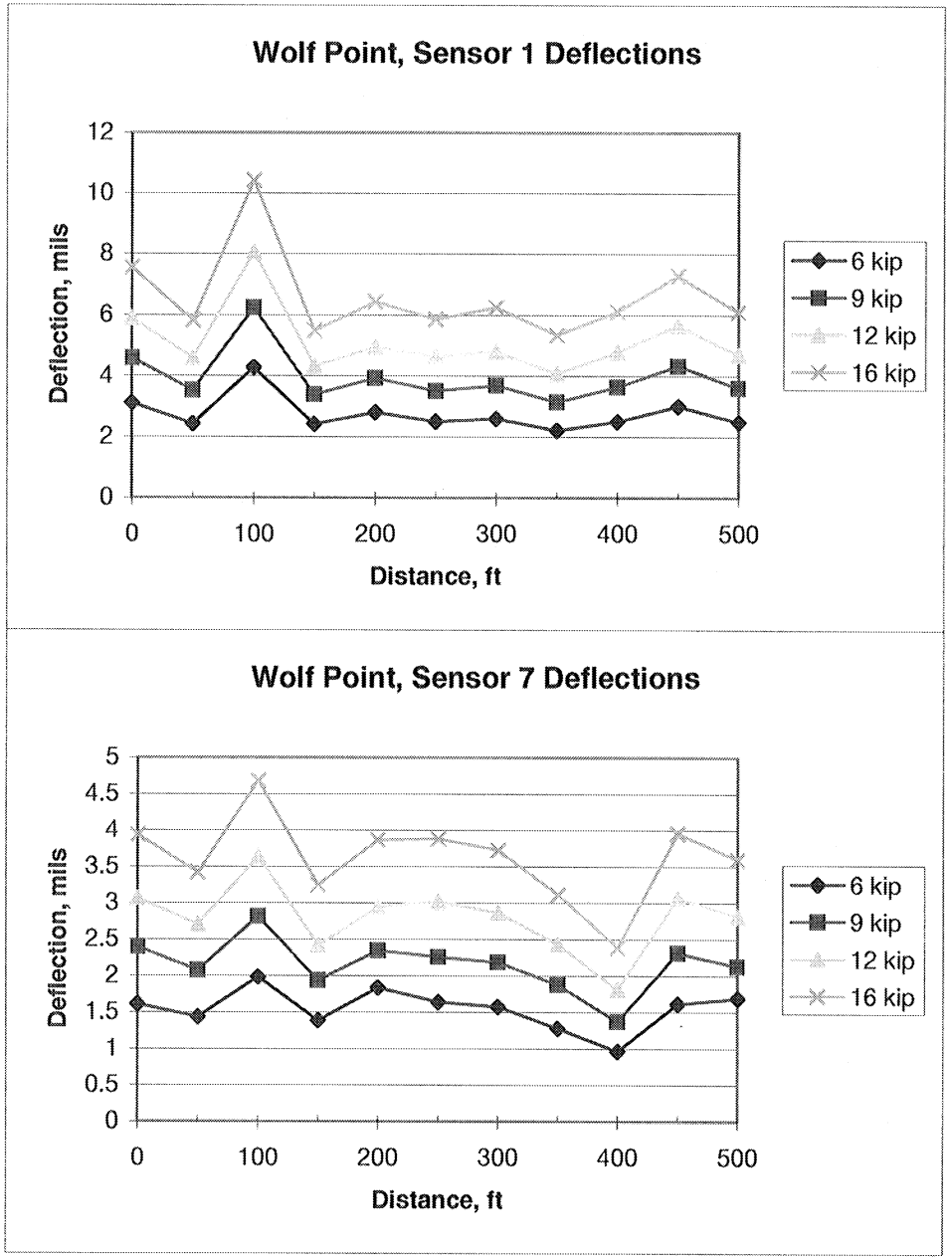
Test Date: 10/9/01

Layer	Material Type	Average Thickness in.
1	ACP	3.7
2	CTB	19.8
3	Subgrade	-

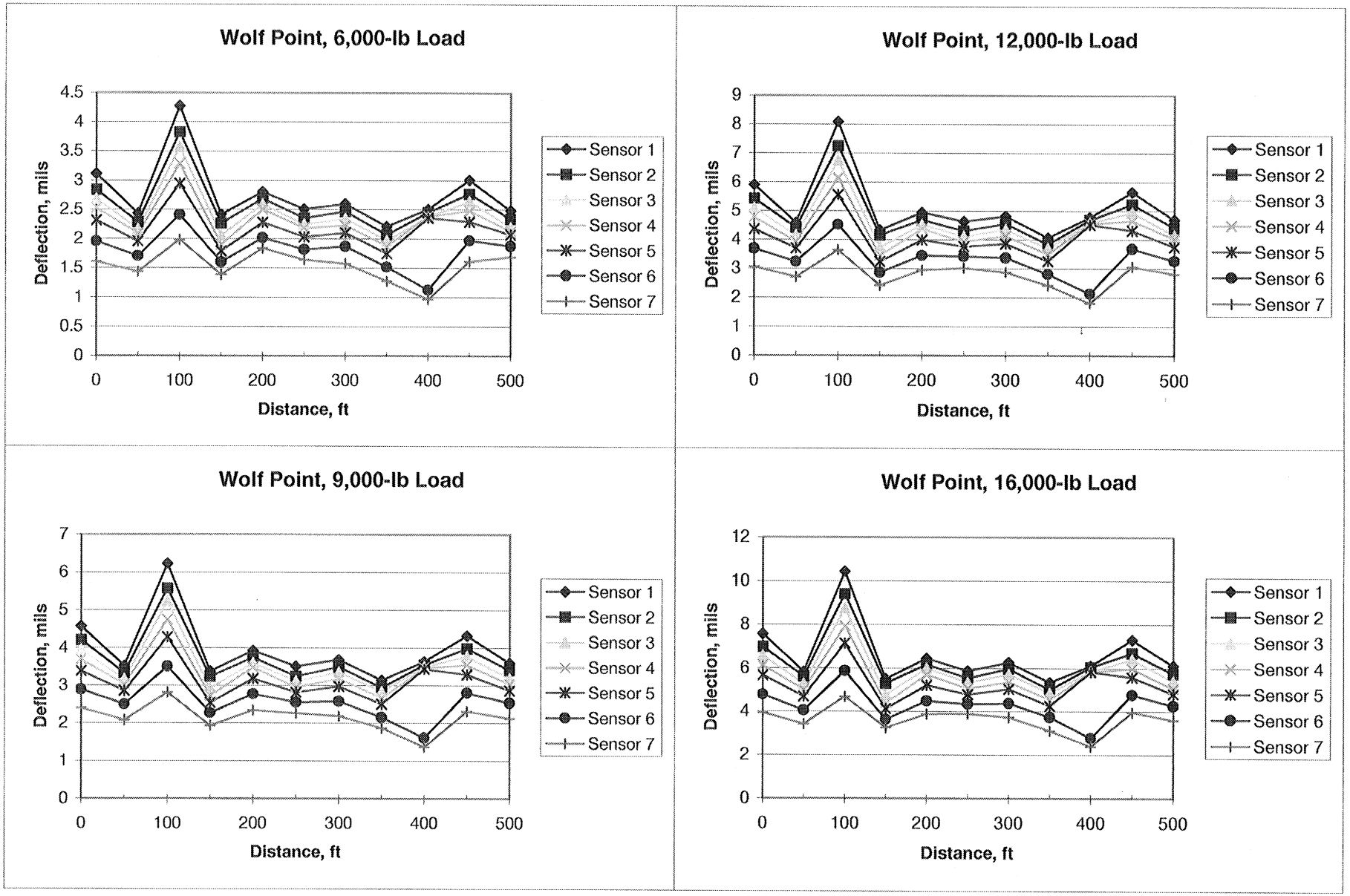
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.20	3.73	3.40	3.22	3.03	2.77	2.34	1.93
0+00	10.07	5.11	4.70	4.42	4.14	3.78	3.23	2.68
0+00	12.34	6.06	5.57	5.24	4.92	4.48	3.79	3.15
0+00	15.51	7.33	6.75	6.37	5.94	5.48	4.62	3.82
0+50	7.23	2.93	2.75	2.61	2.52	2.35	2.05	1.73
0+50	9.97	3.90	3.69	3.51	3.36	3.16	2.76	2.30
0+50	12.32	4.71	4.52	4.26	4.04	3.80	3.32	2.78
0+50	15.39	5.61	5.39	5.08	4.81	4.50	3.88	3.29
1+00	7.08	5.04	4.51	4.22	3.88	3.47	2.84	2.34
1+00	9.86	6.83	6.11	5.73	5.21	4.69	3.84	3.08
1+00	12.33	8.30	7.44	6.94	6.31	5.70	4.64	3.74
1+00	15.18	9.90	8.92	8.30	7.53	6.76	5.56	4.44
1+50	7.09	2.85	2.67	2.43	2.25	2.11	1.89	1.64
1+50	9.96	3.74	3.58	3.24	3.02	2.81	2.51	2.14
1+50	12.29	4.43	4.25	3.83	3.54	3.31	2.93	2.48
1+50	15.40	5.29	5.09	4.59	4.22	3.96	3.49	3.13
2+00	7.09	3.31	3.17	3.06	2.96	2.69	2.38	2.17
2+00	9.91	4.32	4.12	3.97	3.84	3.50	3.05	2.58
2+00	12.29	5.06	4.79	4.63	4.48	4.08	3.53	3.02
2+00	15.42	6.21	5.93	5.78	5.50	5.01	4.31	3.73
2+50	7.28	3.04	2.85	2.73	2.65	2.46	2.20	1.99
2+50	9.72	3.79	3.50	3.37	3.19	3.04	2.75	2.44
2+50	12.00	4.63	4.30	4.12	3.94	3.76	3.42	3.02
2+50	15.47	5.67	5.34	5.17	4.89	4.62	4.19	3.76

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	7.24	3.13	2.97	2.83	2.69	2.53	2.25	1.90
3+00	9.64	3.95	3.74	3.59	3.41	3.18	2.76	2.34
3+00	12.04	4.82	4.56	4.37	4.15	3.87	3.38	2.88
3+00	15.44	6.04	5.75	5.52	5.18	4.85	4.21	3.60
3+50	7.18	2.64	2.47	2.36	2.25	2.09	1.81	1.53
3+50	9.61	3.35	3.14	3.03	2.85	2.67	2.29	2.00
3+50	11.94	4.05	3.82	3.69	3.49	3.24	2.79	2.42
3+50	15.41	5.14	4.81	4.67	4.38	4.09	3.59	3.00
4+00	7.09	2.96	2.89	2.81	2.82	2.78	1.33	1.14
4+00	9.59	3.87	3.78	3.73	3.70	3.66	1.71	1.46
4+00	11.88	4.72	4.63	4.55	4.50	4.47	2.11	1.79
4+00	15.41	5.88	5.82	5.65	5.62	5.61	2.67	2.30
4+50	7.11	3.56	3.28	3.13	2.94	2.71	2.33	1.91
4+50	9.58	4.60	4.24	4.03	3.78	3.50	2.98	2.46
4+50	12.01	5.65	5.22	4.95	4.66	4.32	3.69	3.07
4+50	15.34	6.99	6.40	6.14	5.74	5.34	4.56	3.80
5+00	7.11	2.94	2.77	2.60	2.53	2.45	2.22	2.00
5+00	9.61	3.84	3.64	3.41	3.25	3.06	2.71	2.27
5+00	11.99	4.68	4.41	4.15	4.03	3.75	3.26	2.81
5+00	15.37	5.86	5.51	5.18	4.85	4.61	4.09	3.46

non-decreasing deflection


Wolf Point, Sensor 1 Deflections
Deflection, mils
12
10
8
6
4
2
0
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip
Wolf Point, Sensor 7 Deflections
Deflection, mils
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip

FWD Deflections



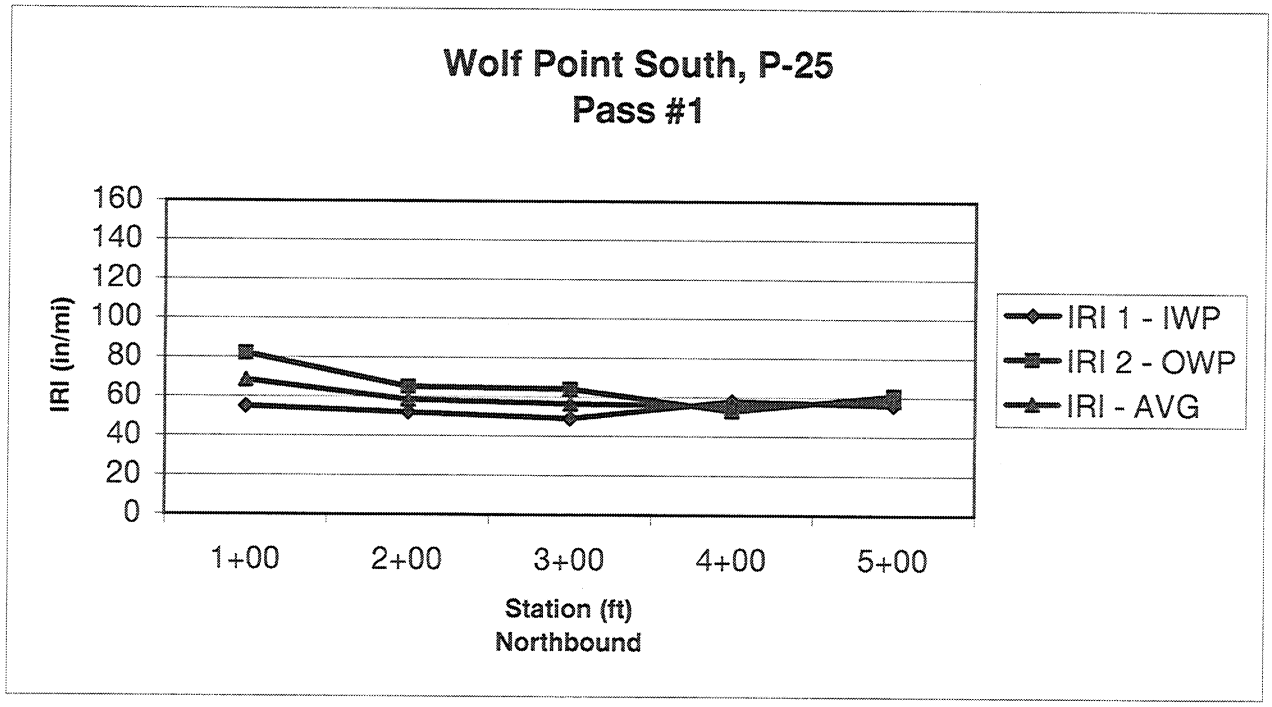
Montana Performance Prediction Models Contract
Field Data Report

Location: Wolf Point
Longitude: 105°31' W
Lattitude: 47°57' N

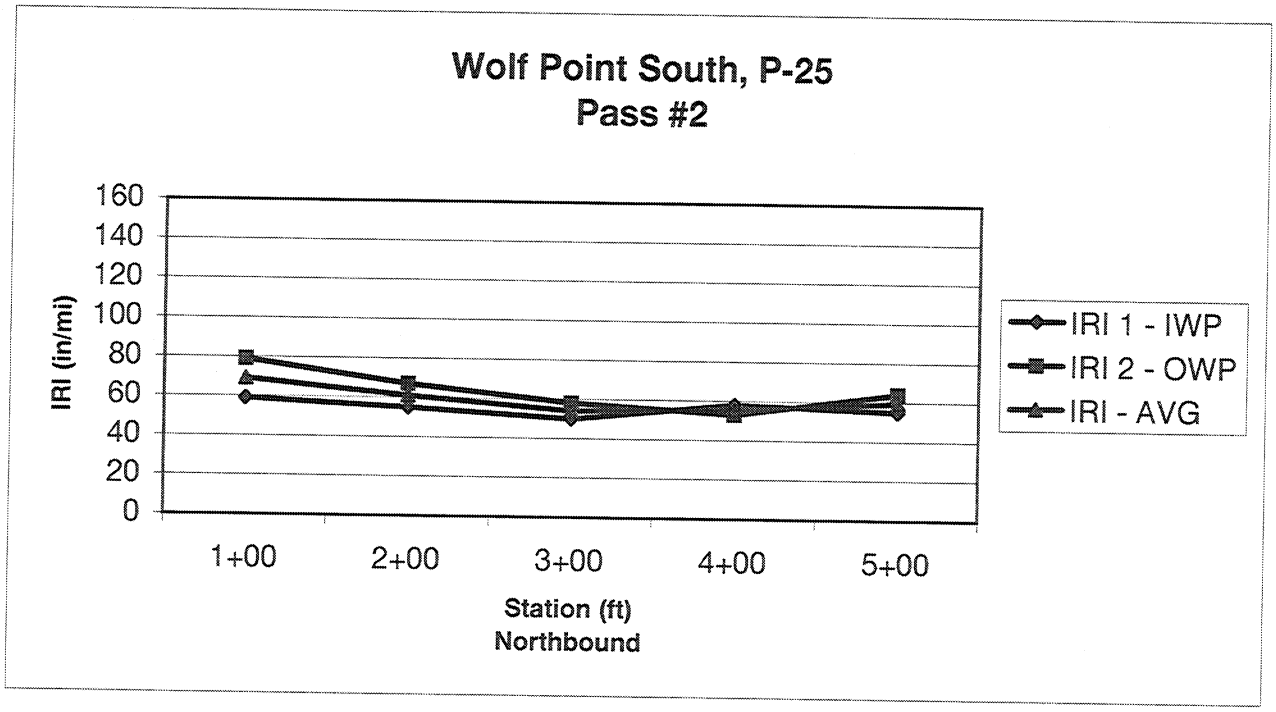
Profile Data

Test Date: 9/26/01

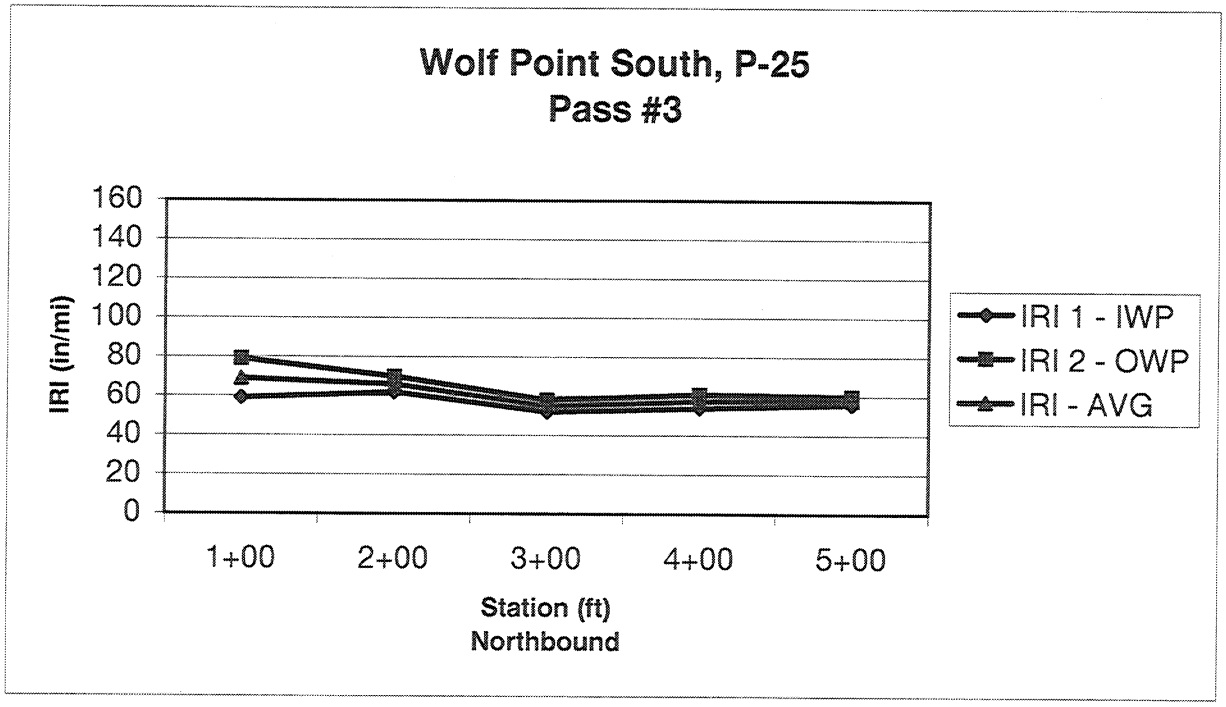
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.00	0.001	55	82	69
2+00	100	200	100	0.02	0.015	52	65	59
3+00	200	300	100	0.02	0.013	49	64	57
4+00	300	400	100	0.00	0.000	58	53	56
5+00	400	500	100	0.01	0.008	56	61	59
AVG.				0.010	0.007	54.0	65.0	59.5
STD.				0.010	0.007	3.536	10.607	5.196



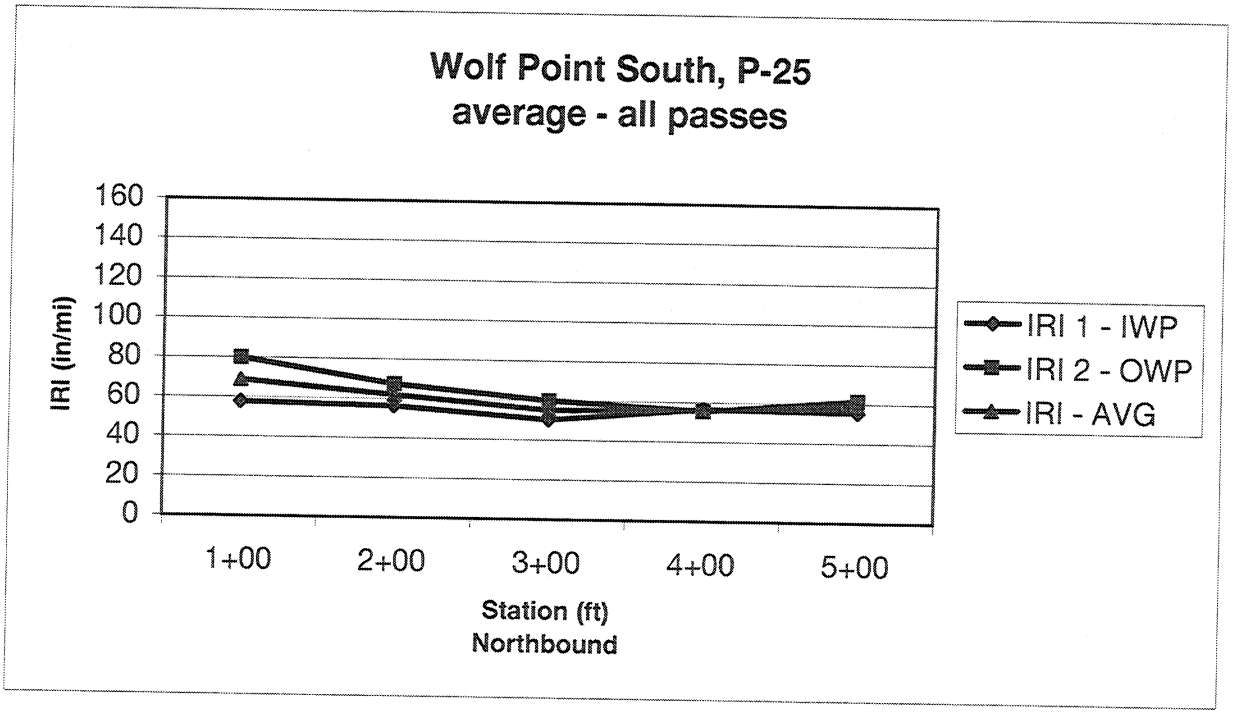
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.00	0.000	59	79	69
2+00	100	200	100	0.01	0.009	55	67	61
3+00	200	300	100	0.02	0.015	50	58	54
4+00	300	400	100	0.00	0.000	58	53	56
5+00	400	500	100	0.01	0.013	55	64	60
AVG.				0.008	0.007	55.4	64.2	59.8
STD.				0.008	0.007	3.507	9.884	5.880



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.00	0.000	59	79	69
2+00	100	200	100	0.00	0.000	62	70	66
3+00	200	300	100	0.00	0.000	52	58	55
4+00	300	400	100	0.00	0.000	54	61	58
5+00	400	500	100	0.01	0.011	56	60	58
AVG.				0.002	0.002	56.6	65.6	61.1
STD.				0.004	0.005	3.975	8.792	6.046



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.00	0.000	58	80	69
2+00	100	200	100	0.01	0.008	56	67	62
3+00	200	300	100	0.01	0.009	50	60	55
4+00	300	400	100	0.00	0.000	57	56	56
5+00	400	500	100	0.01	0.011	56	62	59
AVG.				0.007	0.006	55.3	64.9	60.1
STD.				0.006	0.005	2.887	9.403	5.503



APPENDIX G

FORT BELKNAP

Montana Performance Prediction Models Contract
Field Data Report

Location: Fort Belknap
Longitude: 108°30' W
Lattitude: 48°25' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	5.1	3.9	4.5	Chip Seal
2	CTB	8.0	7.0	7.5	
3	Base	41.0	37.0	39.0	Sandy Clayer Gravel
4	Subgrade	-	-	-	Brown Fine Sand with some Gravelly Clay

Materials Sampling

Date: 4/25/02

Material Type	Quantity	Comments
ACP/CTB	14 cores	2-10" & 12-6" cores
CTB	1 bag	ACP/CTB cores
Base		
Subgrade	4 bags	1 TBD

* 4 bags of material from station 5+56 could not be clearly identified because the layers could not be distinguished

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Ft Belknap ROUTE/HIGHWAY P-1 AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V #1 (b) After Section _____ Lane _____ Direction WB

FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-25-02 LOCATION STATION: RP 442 (E. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	5.0"	PMS	
2	13.0"	CTB	
3		OTHER BASECOURSE ?? Sandy clayey gravel	Split Spoon 52 Blows 12" + 18" = 31" Sample 7.0" – 13.0"
4			
5	4.5'		
6		Brn fine Sand w/ Thin grey cly layers incr. cly ↓ Subgrade	Sample 30.0" – 48.0" 54 Blows Sample 36.0" – 42"
7			
8			Sample 50" – 60" x2
9			
10	10.0'		
11		Brn fine Sand w/gravel	Sample 10' – 15'
12			
13			
14			
15			
16			
17			
18	18'		
19		brn gravelly clay Saturated	
20	Dry @ bottom		

REFUSAL WITHIN 20 FEET (Y/N): _____ DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

Form SO5/April 1990

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Ft Belknap ROUTE/HIGHWAY P-1 AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section _____ (b) After Section ✓ #2 Lane _____ Direction WB

FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 4-25-02 LOCATION STATION: RP442 (W. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	4"	PMS	
2		CTB ??	Drilling @ 7"
3		dk brn gravelly Sand/sandy gravel ↓ 13.5" ↓ 16.0" ↓ 21.0" ↓ 33.0"	Sample 7" – 13"
4	4.0'		Sample 16" – 21"
5		brn fine sand w/ local stiff clay & gravel	Sample x2
6		Subgrade	33" – 60"
7			
8	7.5'		
9		dk brn clayey sand	Sample
10		incr. clay ↓	7.5' – 18'
11	11'		
12		dk brn clay	
13	12.5'		
14		lt org-brn gravel zones ↓ dk brn clayey Sand	
15			
16			
17			
18	18'		
19		brn very fine clayey Sand	
20	Dry @ bottom	Saturated	

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
_____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
_____-_____-19__
Date

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: FT. BELNAP (HARLEM)

Core Log. No. CL-3-25-02 Hole No. 1

Driller MAYBERRY Crew JOHN. SAM Geotech GREG & WIWL. DW

Date 4/25/02 Drill Simco Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FINGER

Elev. _____ Water Level _____ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 0.7	SPT/SHELBYS	PSI	RATE
BROWN SAND	13" - 31"	55 52	COUNT
GRAVEL 4.5	30" - 48"	55 54	"
BROWN FINE	BAG AT 42"		
SILTY SAND W/	BAG AT 15.		
SOME GRAVEL			

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: FT. BELVOIR (HARLEM)

Core Log. No. CL-3-26-02 Hole No. 2

Driller MAYBERRY Crew JOHN SAM Geotech GREG & WINDOW

Date 4/25/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FINGER

Elev. _____ Water Level _____ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 4"	SPT/SHELBYS	PSI	RATE
BROWN SILTY	BAG AT 21'		
SANDY GRAVEL	BAG AT 45'		
75 DK BROWN	DRILLED TO 20'		
FINE SAND W/S	NO SAMPLES		
GRAVEL			

Montana Performance Prediction Models Contract
Field Data Report

Location: Fort Belknap
Longitude: 108°30' W
Lattitude: 48°25' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/25/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	140.5	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	25	0	0
	Length (Meters)	51.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Fort Belknap
Longitude: 108°30' W
Lattitude: 48°25' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/25/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL	
		N/A	
SURFACE DEFORMATION			
9	RUTTING - REFER TO PROFILE DATA		
10	SHOVING		
	(Number)		0
	(Square Meters)		0.0
SURFACE DEFECTS			
11	BLEEDING		
	(Square Meters)		0.0
12	POLISHED AGGREGATE		
	(Square Meters)		0.0
13	RAVELING		
	(Square Meters)		0.0
MISCELLANEOUS DISTRESSES			
14	LANE-TO-SHOULDER DROPOFF - Not Recorded		
15	WATER BLEEDING AND PUMPING		
	(Number)		0
	Length of Affected Pavement		
	(Meters)		0.0
16	OTHER (Describe)		

Reviewer: _____ Surveyors: [illegible]

Date: _____ Date: 4/25/02

Pavement Temp:

Before_____ After_____

State Assigned ID _____

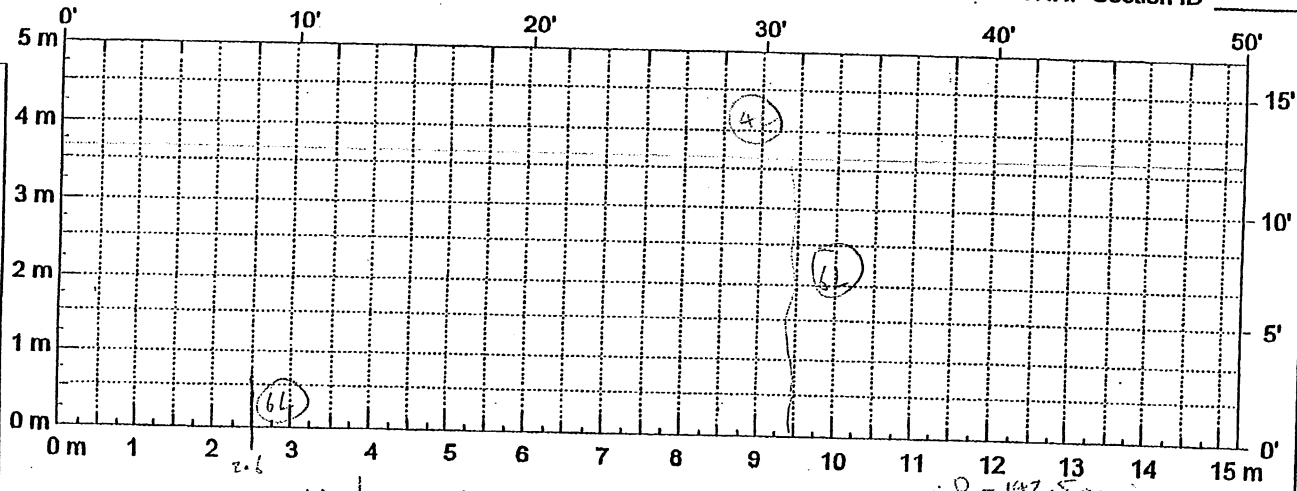
State Code _____

SHRP Section ID _____

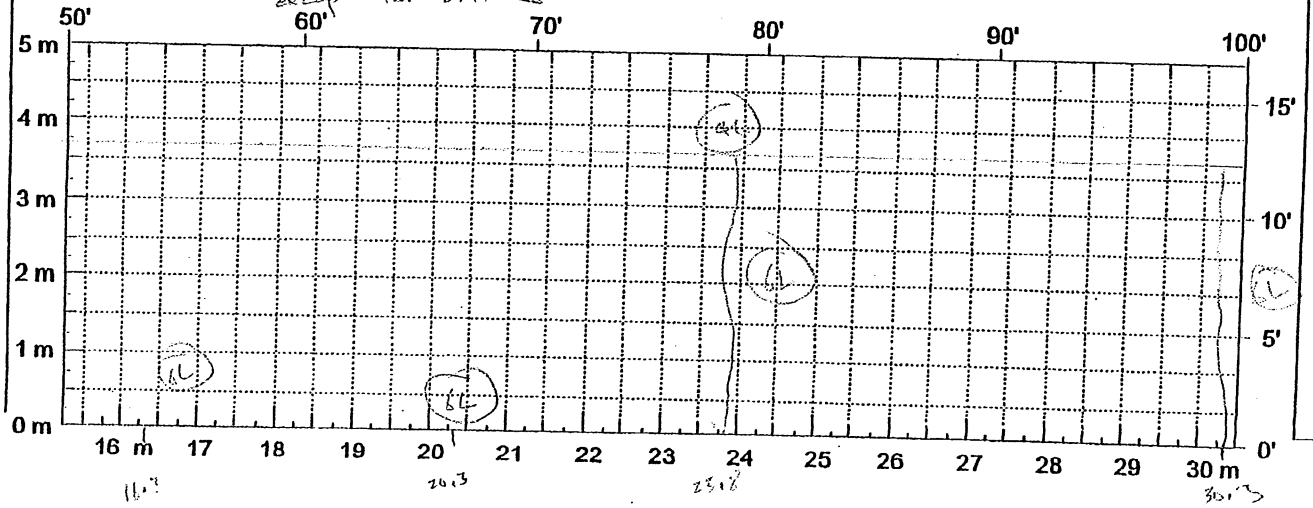
Section Summary

4L = 100.5

6L = 12.99 (6)
5.46 (6)
11.29 (4)
11.42 (5)
9.82 (4)
50.96 (25)



Comments: Longitudinal cracking along the centerline stripe from 0 – 142.5 m in the section except for 2 m.



Comments: _____

Sheet Summary

6L = 1.1 + 5.66 + 0.3 + 0.3 + 0.3 + 3.66 + 3.66 = 12.99 (6)

4L = 100.5

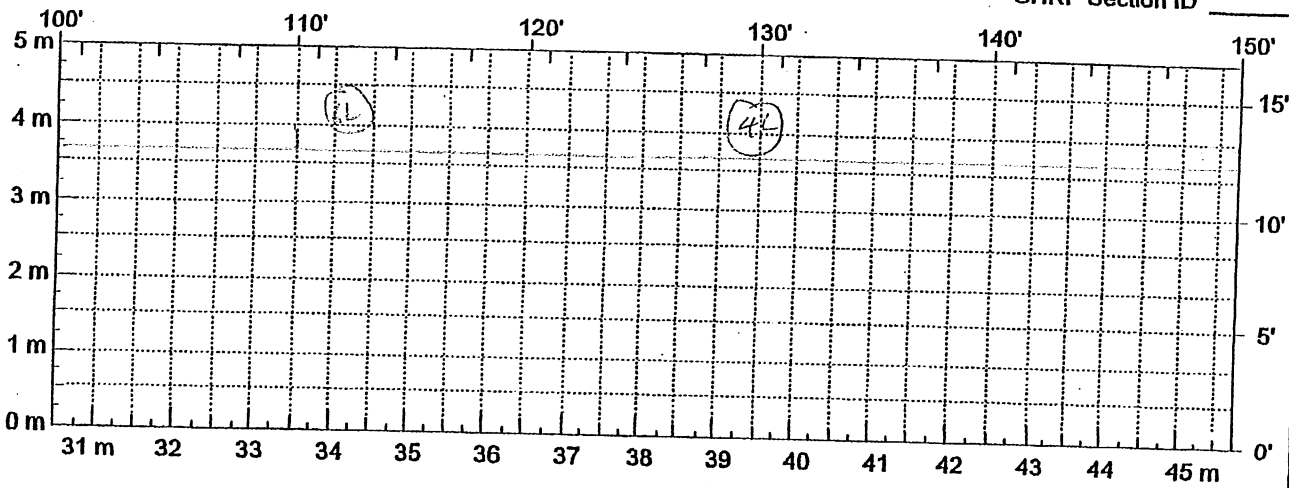
Reviewer: _____ Surveyors: WS | CS

Date: _____ Date: 9/25/02

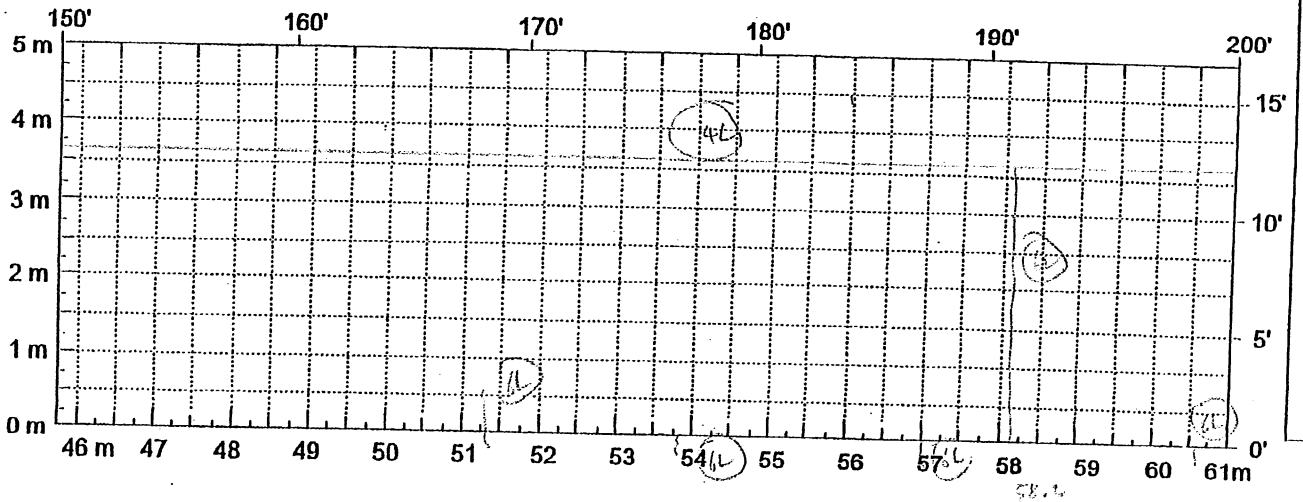
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

3L = 0.3 + 0.9 + 0.5 + 3.66 + 0.3 = 5.46 (5)

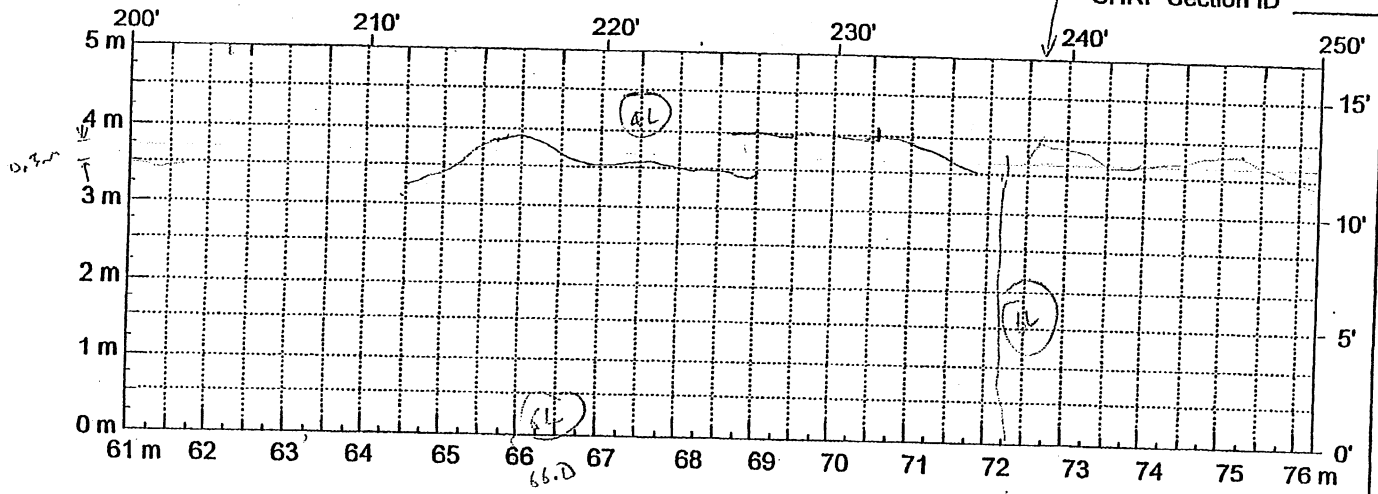
Reviewer: _____ Surveyors: MST/SS

Date: _____ Date: 4/xx/xx

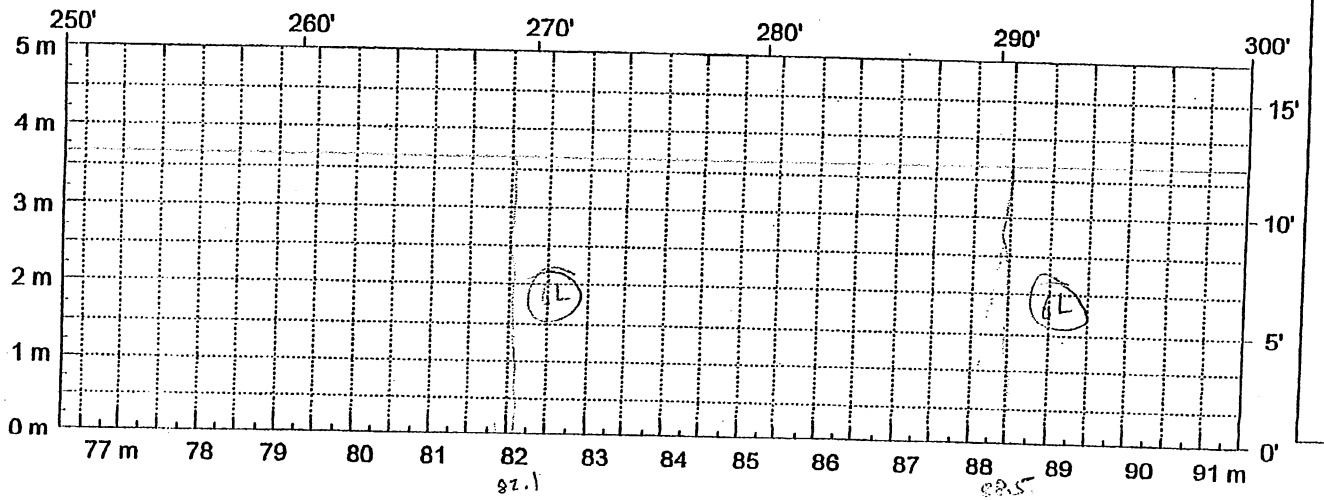
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

GL = 0.3 + 3.66 + 3.66 + 3.66 = 11.28 m (37')

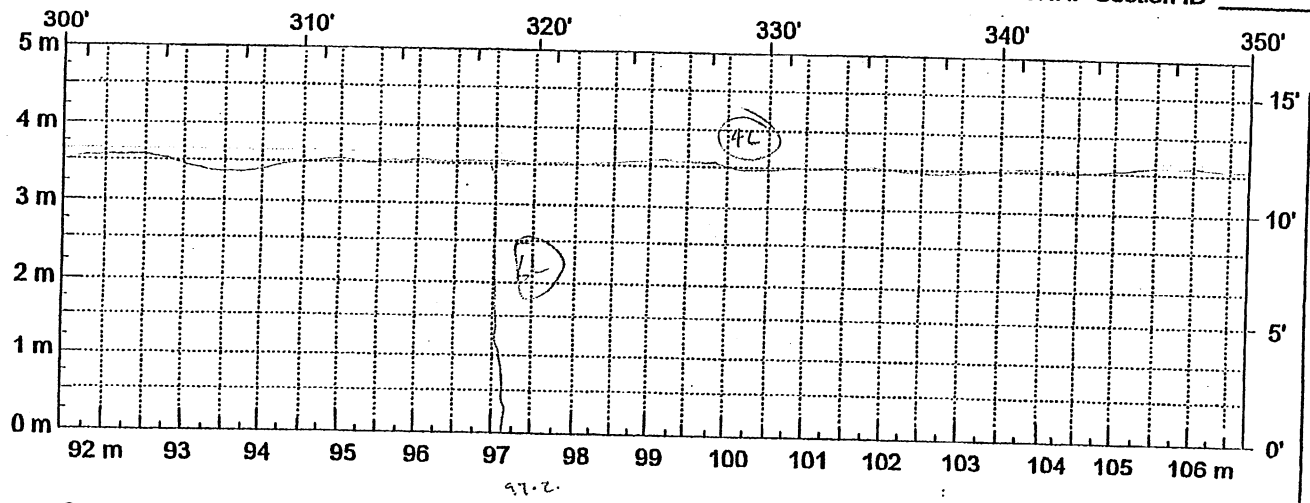
Reviewer: _____ Surveyors: ST / BS

Date: _____ Date: 4/24/02

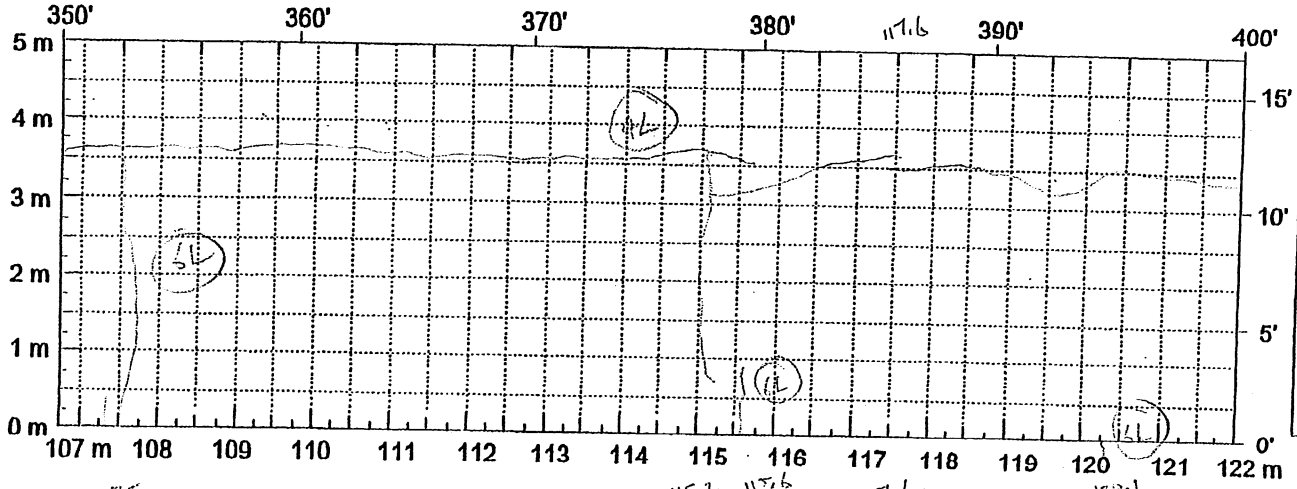
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

SL = 3.66 x 3.66
+3.0 x 0.8 x 0.3
= 11.92 m² (S)

Reviewer: _____ Surveyors: _____

Date: _____ Date: _____

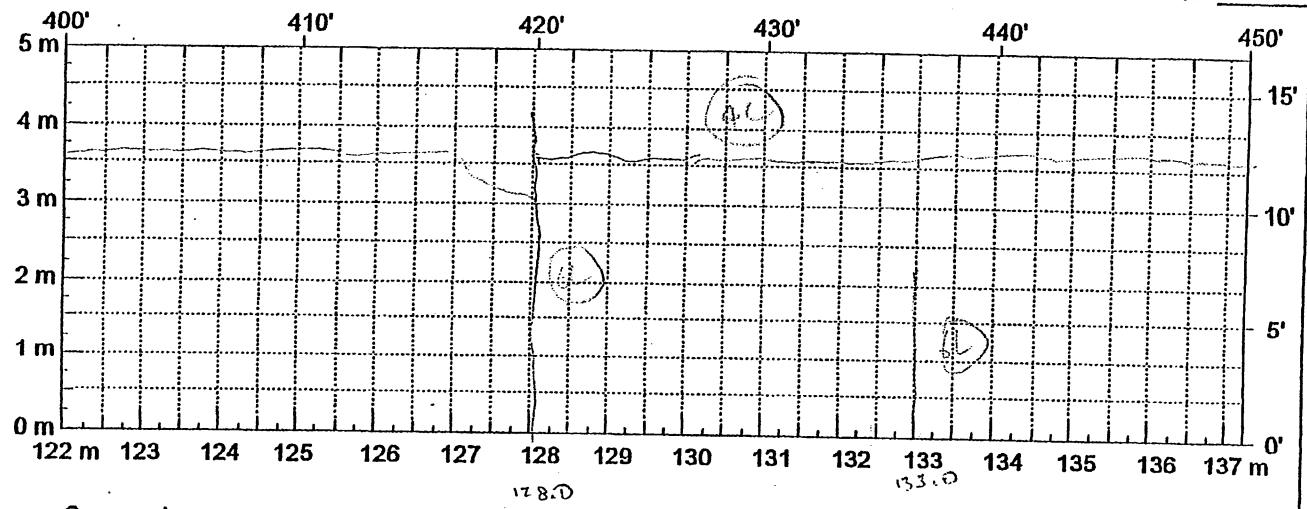
Pavement Temp:

After _____

State Assigned ID _____

State Code _____

SHRP Section ID _____



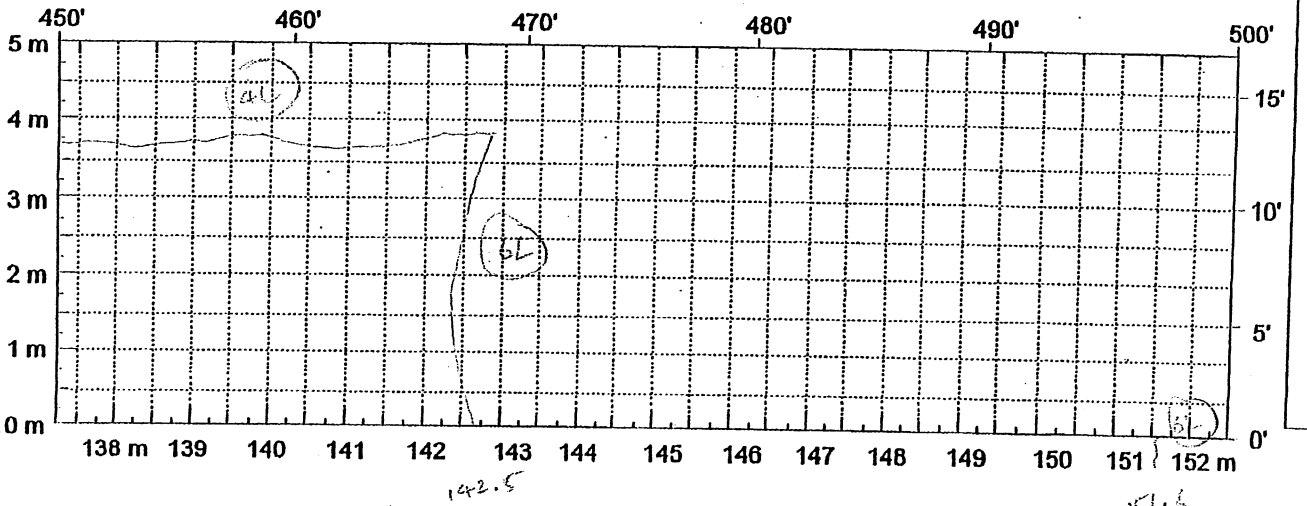
Sheet Summary

$\bar{SL} = 3.66 + 2.2 + 3.6$

$+ 0.3$

$= 9.82$ (4)

Comments: _____



Comments: _____

Montana Performance Prediction Models Contract
Field Data Report

Location: Fort Belknap
Longitude: 108°30' W
Lattitude: 48°25' N

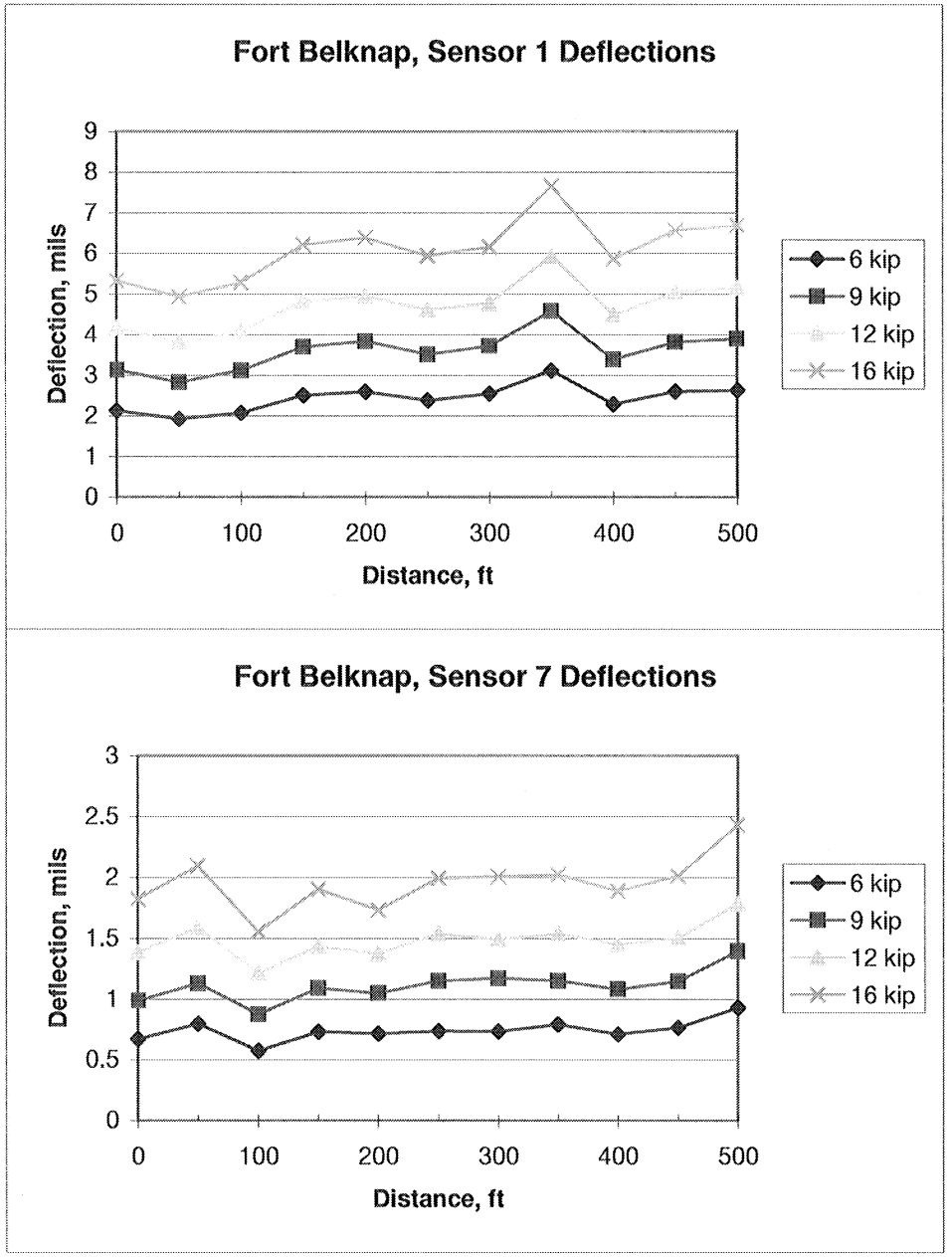
FWD Data

Test Date: 10/9/01

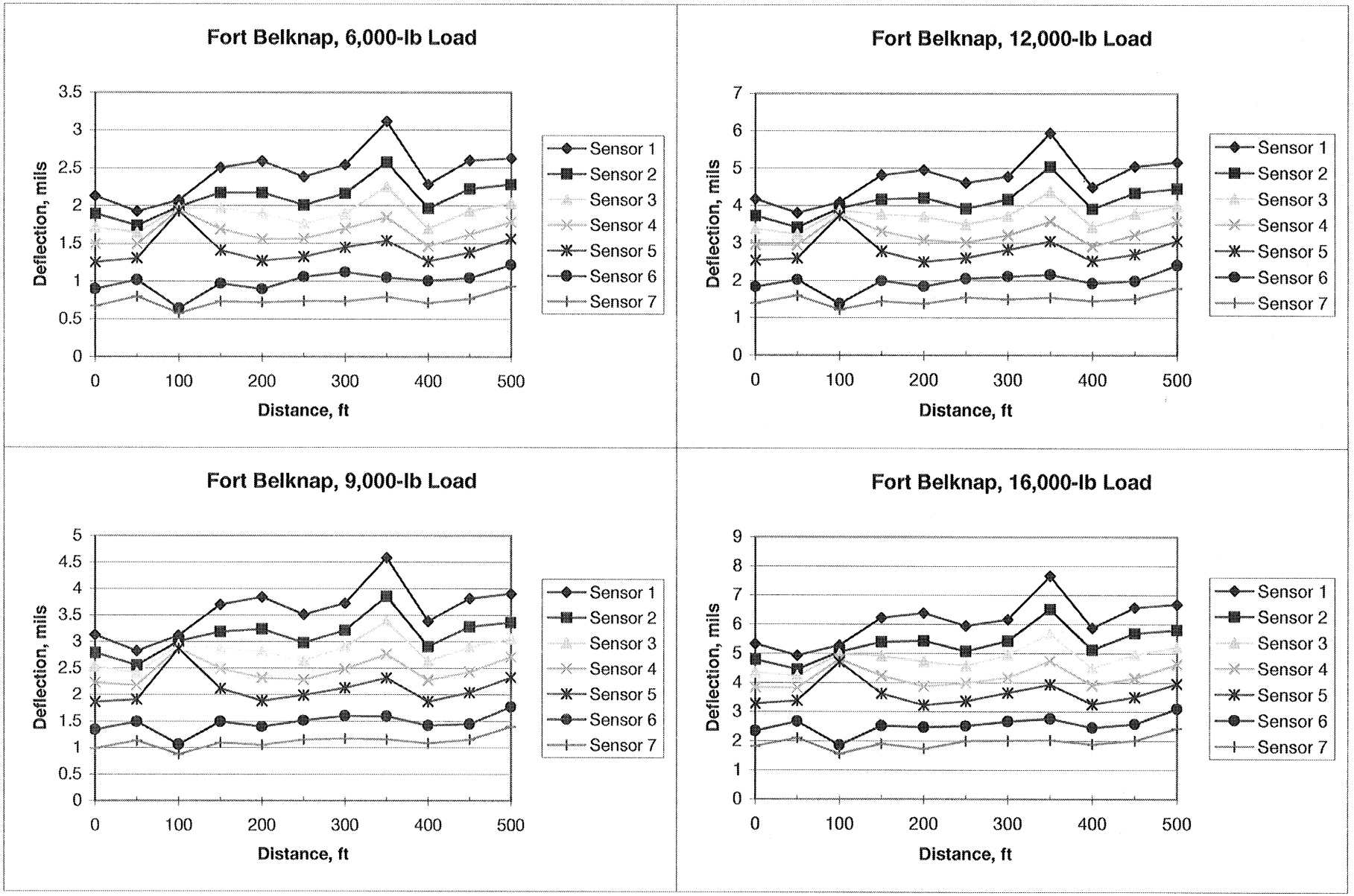
Layer	Material Type	Average Thickness in.
1	ACP	4.5
2	CTB	7.5
3	Base	39.0
4	Subgrade	-

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.16	2.54	2.26	2.04	1.78	1.49	1.07	0.80
0+00	9.23	3.20	2.86	2.60	2.28	1.91	1.37	1.01
0+00	11.36	3.95	3.53	3.19	2.79	2.40	1.73	1.31
0+00	14.57	4.85	4.36	3.97	3.50	2.99	2.13	1.66
0+50	7.09	2.27	2.05	1.94	1.76	1.54	1.20	0.94
0+50	9.31	2.92	2.64	2.49	2.25	1.97	1.54	1.17
0+50	11.35	3.60	3.23	3.06	2.78	2.45	1.91	1.50
0+50	14.58	4.49	4.06	3.86	3.48	3.08	2.43	1.91
1+00	7.01	2.42	2.32	2.30	2.27	2.25	0.75	0.67
1+00	9.17	3.17	3.06	2.99	2.93	2.92	1.08	0.89
1+00	11.38	3.88	3.73	3.67	3.56	3.54	1.30	1.15
1+00	14.51	4.79	4.58	4.52	4.36	4.27	1.68	1.41
1+50	7.07	2.95	2.56	2.31	1.99	1.66	1.14	0.86
1+50	9.25	3.80	3.27	2.95	2.56	2.17	1.53	1.12
1+50	11.38	4.57	3.95	3.57	3.14	2.63	1.89	1.36
1+50	14.54	5.65	4.90	4.47	3.85	3.29	2.29	1.73
2+00	7.05	3.04	2.55	2.23	1.83	1.49	1.05	0.84
2+00	9.10	3.88	3.27	2.84	2.34	1.90	1.41	1.06
2+00	11.36	4.69	3.98	3.51	2.91	2.36	1.74	1.30
2+00	14.51	5.79	4.93	4.28	3.51	2.92	2.24	1.57
2+50	7.03	2.79	2.35	2.06	1.83	1.55	1.24	0.86
2+50	9.16	3.57	3.03	2.68	2.32	2.02	1.54	1.17
2+50	11.24	4.32	3.67	3.27	2.82	2.44	1.92	1.44
2+50	14.60	5.42	4.63	4.18	3.63	3.07	2.29	1.82

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	6.97	2.95	2.51	2.20	1.97	1.68	1.30	0.85
3+00	9.14	3.78	3.26	2.95	2.52	2.16	1.62	1.19
3+00	11.35	4.52	3.94	3.52	3.03	2.67	1.99	1.41
3+00	14.34	5.52	4.86	4.43	3.74	3.27	2.39	1.80
3+50	6.92	3.59	2.97	2.60	2.13	1.77	1.21	0.91
3+50	9.14	4.65	3.91	3.43	2.80	2.35	1.61	1.17
3+50	11.31	5.60	4.75	4.12	3.37	2.87	2.03	1.45
3+50	14.48	6.93	5.89	5.13	4.29	3.56	2.50	1.83
4+00	6.94	2.64	2.27	1.96	1.69	1.46	1.16	0.82
4+00	9.08	3.41	2.93	2.65	2.29	1.88	1.43	1.09
4+00	11.20	4.19	3.65	3.20	2.71	2.35	1.79	1.35
4+00	14.34	5.26	4.59	4.03	3.50	2.92	2.20	1.69
4+50	6.91	2.99	2.56	2.22	1.86	1.59	1.20	0.88
4+50	9.11	3.86	3.32	2.93	2.45	2.06	1.46	1.16
4+50	11.20	4.71	4.05	3.52	3.00	2.52	1.85	1.40
4+50	14.32	5.88	5.09	4.44	3.72	3.13	2.31	1.80
5+00	6.97	3.05	2.65	2.36	2.07	1.81	1.41	1.08
5+00	9.11	3.95	3.40	3.09	2.74	2.35	1.79	1.41
5+00	11.23	4.83	4.17	3.74	3.35	2.86	2.25	1.67
5+00	14.36	6.00	5.21	4.68	4.15	3.55	2.78	2.18


Fort Belknap, Sensor 1 Deflections
Deflection, mils
0
1
2
3
4
5
6
7
8
9
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip
Fort Belknap, Sensor 7 Deflections
Deflection, mils
0
0.5
1
1.5
2
2.5
3
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip

FWD Deflections



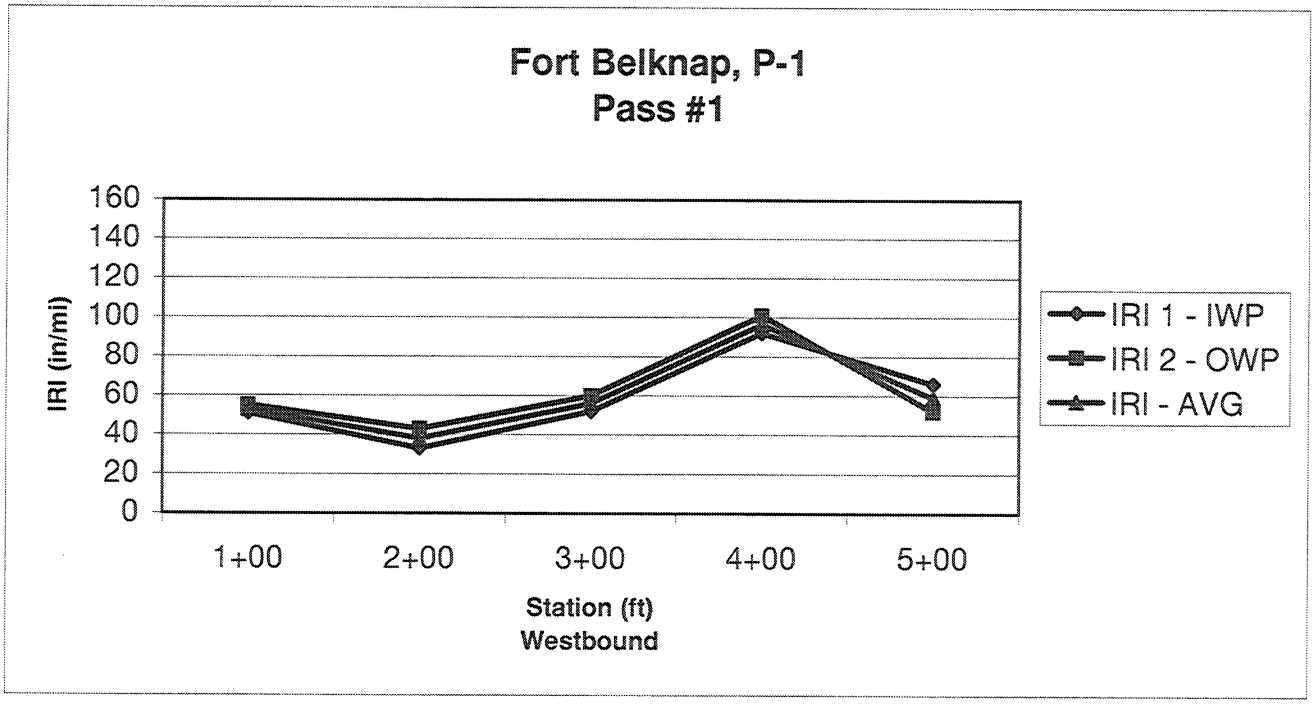
Montana Performance Prediction Models Contract
Field Data Report

Location: Fort Belknap
Longitude: 108°30' W
Lattitude: 48°25' N

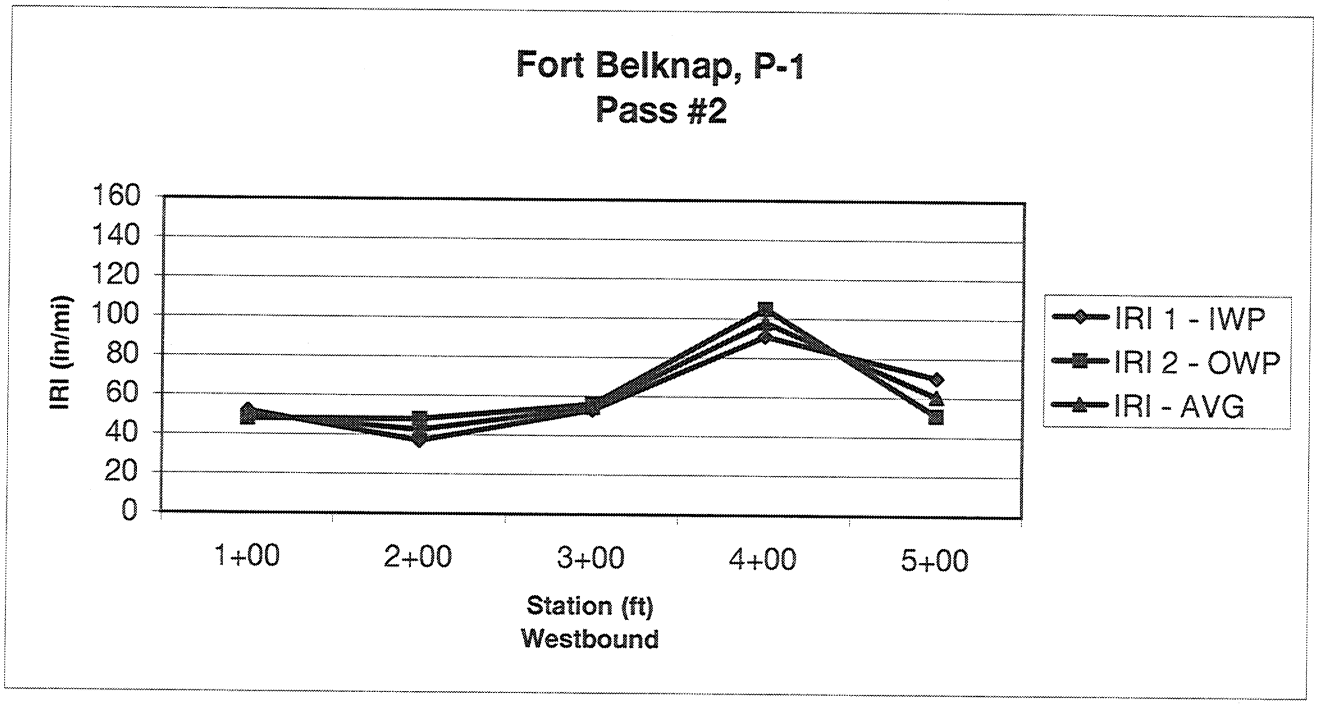
Profile Data

Test Date: 9/26/01

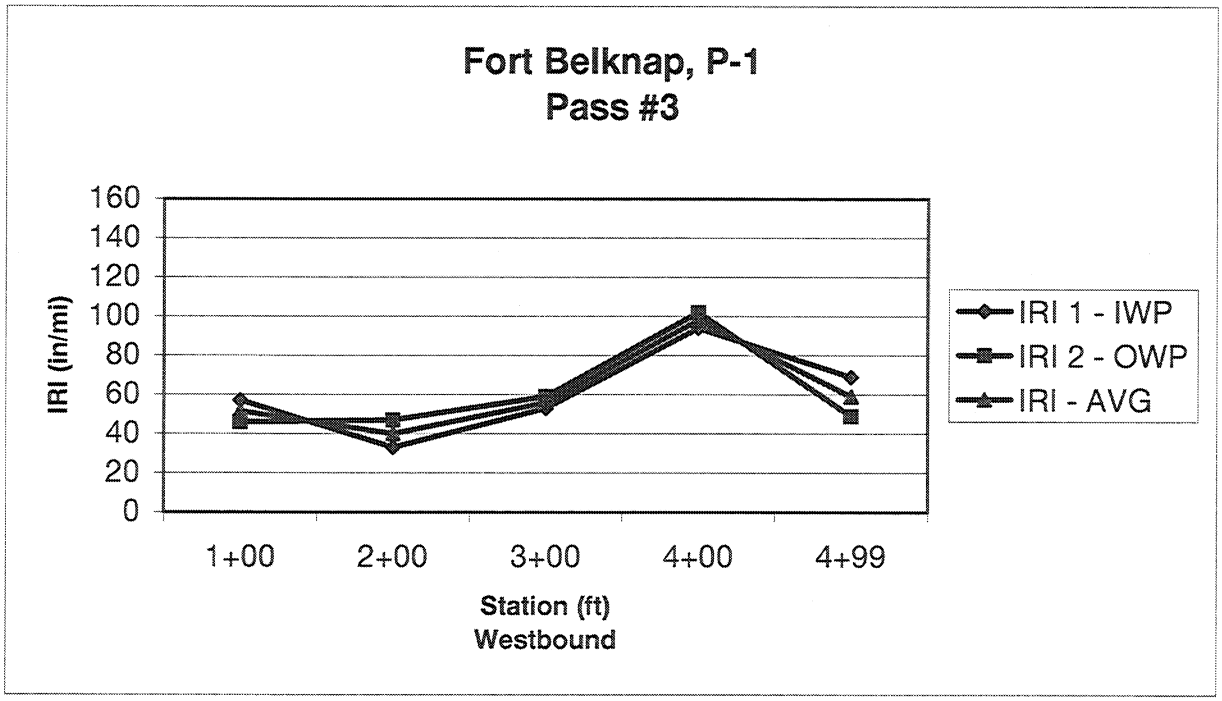
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.11	0.034	51	55	53
2+00	100	200	100	0.08	0.025	33	43	38
3+00	200	300	100	0.09	0.027	52	60	56
4+00	300	400	100	0.17	0.040	92	101	97
5+00	400	500	100	0.18	0.024	66	52	59
AVG.				0.126	0.030	58.8	62.2	60.5
STD.				0.046	0.007	21.948	22.554	21.685



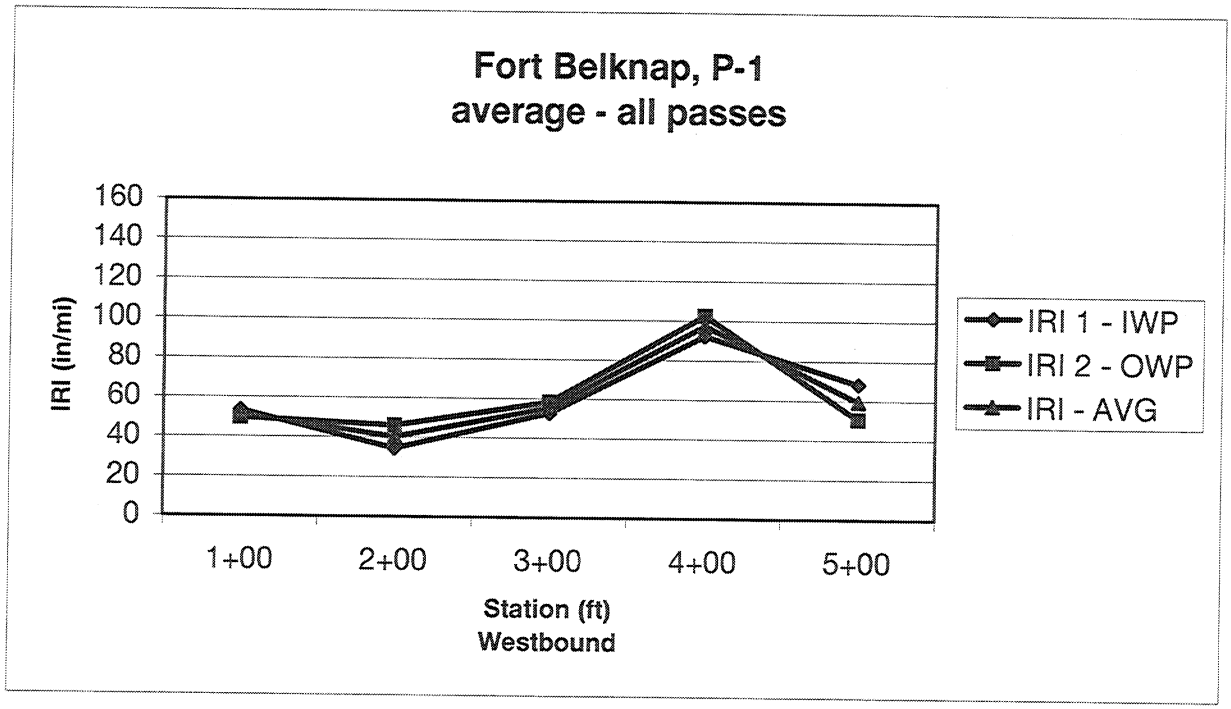
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.09	0.055	52	48	50
2+00	100	200	100	0.02	0.014	37	48	43
3+00	200	300	100	0.07	0.024	53	56	55
4+00	300	400	100	0.16	0.039	91	105	98
5+00	400	500	100	0.17	0.021	70	51	61
AVG.				0.102	0.031	60.6	61.6	61.1
STD.				0.063	0.016	20.623	24.481	21.649



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.11	0.036	57	46	52
2+00	100	200	100	0.09	0.023	33	47	40
3+00	200	300	100	0.12	0.024	53	59	56
4+00	300	400	100	0.17	0.039	94	102	98
4+99	400	499	99	0.17	0.022	69	49	59
AVG.				0.132	0.029	61.2	60.6	60.9
STD.				0.036	0.008	22.454	23.713	21.961



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.10	0.042	53	50	52
2+00	100	200	100	0.06	0.021	34	46	40
3+00	200	300	100	0.09	0.025	53	58	56
4+00	300	400	100	0.17	0.039	92	103	98
5+00	400	500	100	0.17	0.022	68	51	60
AVG.				0.120	0.030	60.2	61.5	60.8
STD.				0.048	0.010	21.632	23.465	21.731



APPENDIX H

ROUNDUP

Montana Performance Prediction Models Contract
Field Data Report

Location:	Roundup
Longitude:	108°31' W
Lattitude:	46°27' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	4.3	4.3	4.3	
2	CTB	17.7	19.7	18.7	
3	Subgrade	-	-	-	Greenish-Brown Silty Clay (Very Stiff w/ Refusal at D=29 - Bore 1)

Materials Sampling

Date: 4/30/02

Material Type	Quantity	Comments
ACP/CTB	14 cores	2-10" & 12-6" cores. The first core 11 was broken. A new core 11 was taken.
CTB	2 bags	ACP/CTB cores
Subgrade	6 bags,1shelby	The subgrade was cohesive but too stiff to take shelby tubes. One small sample was acquired in a shelby tube.

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Roundup E AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V#1 ROUTE/HIGHWAY N/P-14 Lane _____ Direction EB

(b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE DCG SHEET: 08

OPERATOR Don M. EQUIPMENT USED _____ SHEET NUMBER 1 OF 1

AUGERING DATE 4-30-02 LOCATION STATION: RP 171 (W. End) AUGER PROBE NUMBER _____

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1 (12")	4 3/8"	PMS	
2 (24")	10 3/8"	CTB	Recovered w/small Rig
	7"	Lift 2	
3 (36")	20"	Lift 1	Sample 10 1/4" – 20"
	24"		
4 (48")	30"	SUBGRADE brn-greenish gravelly very stiff clay	SHELBY Tube 24" – 29" 5" Recov Tub hard
5 (60")	38"	30"-38" less cohesive brn clayey gravel	Sample 24" – 30"
6	42"	38"-42" sh brn gravelly very stiff clay	Shelby Tube Refusal = .5" 30" – NA
7	54"	42"-54 less cohesive brn clayey gravel	Sample 30" – 42"
8	66"	54"-66" (fine) brn gravelly very stiff plast clay	Sample 54" – 66"
9		decreasing gravel	
10			
11			
12			
13			
14			
15		brn very stiff plastic cly	
16			
17			
18			
19			
20	DRY	9:45 AM Done	

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED _____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ____-____-19__
Date

Form SO5/April 1990

SHRP REGION _____ SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT SHRP ASSIGNED ID _____

LTPP EXPERIMENT Roadway E ROUTE/HIGHWAY N/B-14 Lane _____ Direction EB

SAMPLE/TEST: (a) Before Section _____ (b) After Section V #2 FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan. M EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 04 - 30 - 02 LOCATION STATION: RP 171 (E. End) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	4.5"	PMS	
2	22"	CTB	Sample 10" - 19"
3	36"	grn stiff slightly plastic cly Subgrade	Sample 24" - 30"
4			Sample 30" - 36"
5		olivgrn silt/dry fine sand some gravel	Sample 60" - 72"
6			
7			
8	8'		
9	9'	olivgrn stiff plastic clay	
10		brn stiff plastic cly w/some fine gravel	
11			
12			
13			
14			
15		Slightly moist @ 15'	
16			
17			
18			
19			
20	DRY	11.39 AM ↓ Done	

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: ROUND UP

Core Log. No. CL-3-25-02 Hole No. 1

Driller MAYBERRY Crew JOHN-SAM Geotech WINDOW & GREG

Date 4/30/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FLR

Elev. _____ Water Level ✓ Pipe Installed _____

Comments:

0.0-- ASPHALT 0.5	SPT/SHELBYS	PSI	RATE
CEMENT BASE	0.5 - 2'	BAL	
2.0' BROWN SAND W/ SOME PEA GRAVEL & CLAY 5.0'	2' SHELBY	REFUSAL	
	24" - 30"	BAG	
	30" - 42"	BAG	
BROWN CLAY W/ SOME FINE SAND	42" - 66"	BAL	
20.0 BOH	Drilled TO 20' NO SAMPLES		

Project No. 8021 Control No.

Project Name RESEARCH PROJ Sta.: ROUNDUP

Core Log. No: CL-3-28-02 Hole No. 2

Driller MARRERA Crew JOHN SAM Geotech WILSON
GREG

Date 4/30/02 Drill SIMCO Shelbys ____ # Bag Samples ____

Drilling Method - Augers 8' Casing ____ /Size ____ /Bit F6R

Elev. ____ Water Level — Pipe Installed ____

Comments:

0.0-- ASPHALT 0.5	SPT/SHELBYS	PSI	RATE
CEMENT BASE 17"	10" - 19"	BAL	
BROWN SILTY SAND	19" - 24"	BAL	
W/S GRAVEL & CLAY	24" - 30"	BAL	
Y.D LT BROWN	30" - 36"	BAL	
SILTY SAND W/S	36" - 6'	BAL	
CLAY 20.0	DRILLED TO 20'		
EOH	NO SAMPLES		

Montana Performance Prediction Models Contract
Field Data Report

Location: Roundup
Longitude: 108°31' W
Lattitude: 46°27' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 4/30/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	6	0	0
	Length (Meters)	18.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Roundup
Longitude: 108°31' W
Lattitude: 46°27' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 4/30/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL	
		N/A	
SURFACE DEFORMATION			
9	RUTTING - REFER TO PROFILE DATA		
10	SHOVING (Number)		0
	(Square Meters)		0.0
SURFACE DEFECTS			
11	BLEEDING (Square Meters)		0.0
12	POLISHED AGGREGATE (Square Meters)		0.0
13	RAVELING (Square Meters)		0.0
MISCELLANEOUS DISTRESSES			
14	LANE-TO-SHOULDER DROPOFF - Not Recorded		
15	WATER BLEEDING AND PUMPING (Number)		0
	Length of Affected Pavement (Meters)		0.0
16	OTHER (Describe)		

Reviewer: _____ Surveyors: LT/ES

Date: _____ Date: 9/30/92

Pavement Temp:

Before_____ After_____

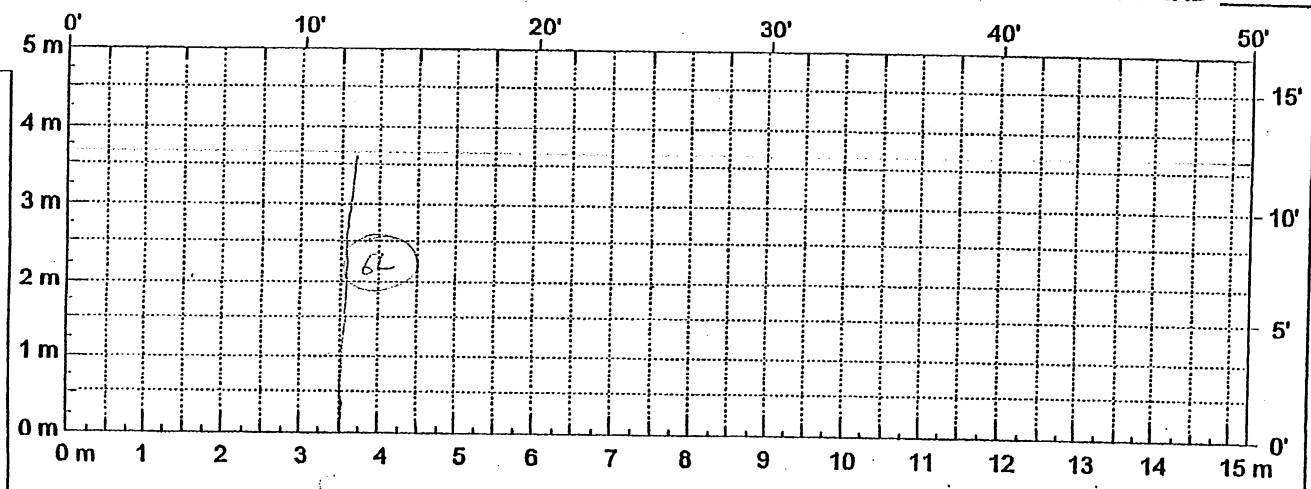
State Assigned ID _____

State Code _____

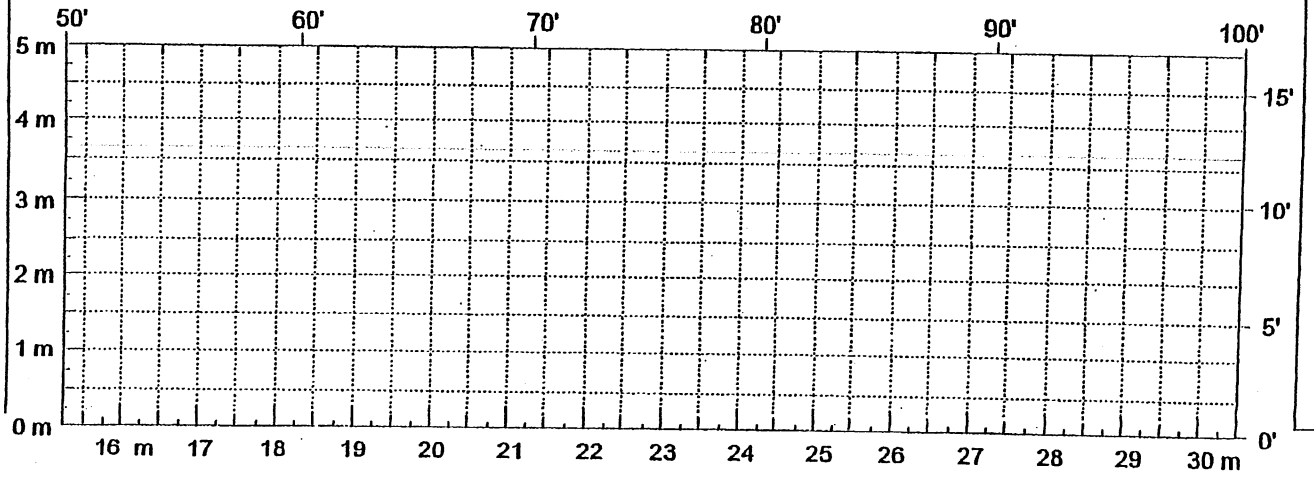
SHRP Section ID _____

Section Summary

SL = 3.66 (1)
3.66 (1)
3.66 (1)
5.90 (2)
1.10 (1)
17.98 (8)



Comments: _____



Comments: _____

Sheet Summary

SL = 3.66 m (1)

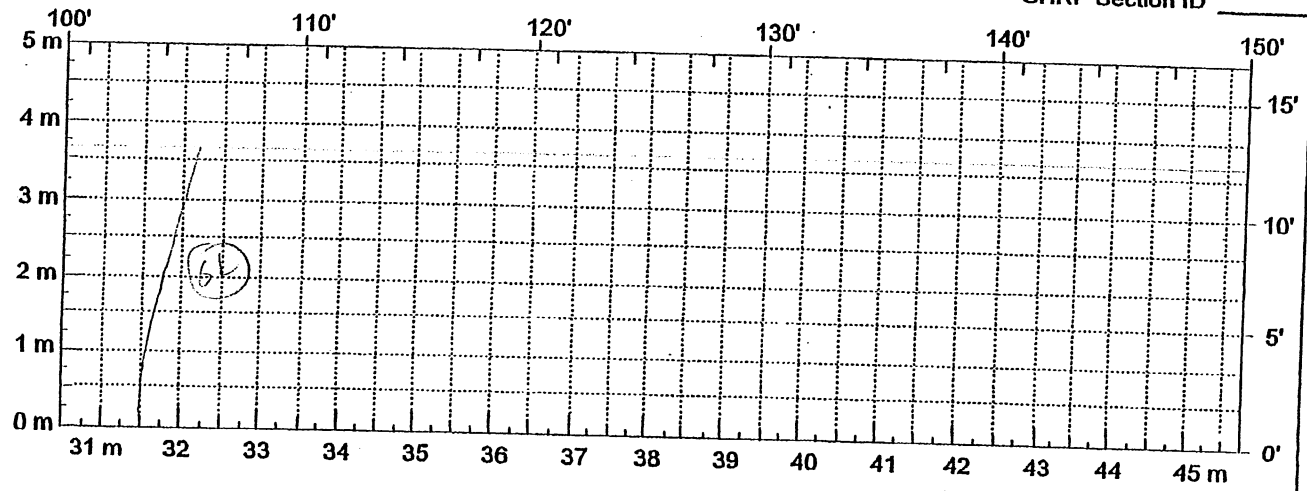
Reviewer: _____ Surveyors: WJ/RS

Date: _____ Date: 4/30/02

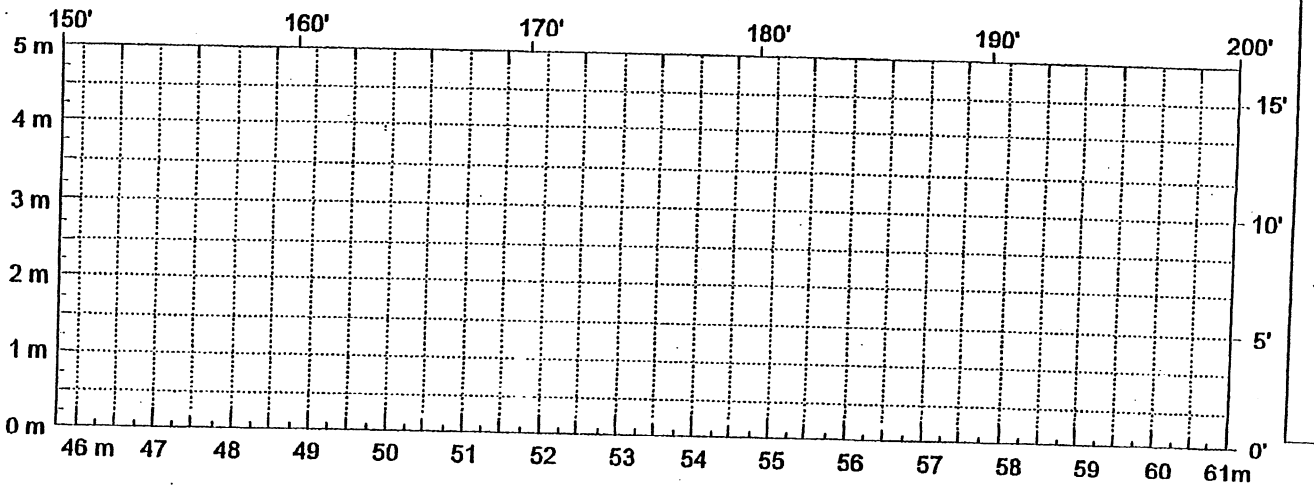
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

6L = 3.65m (+)

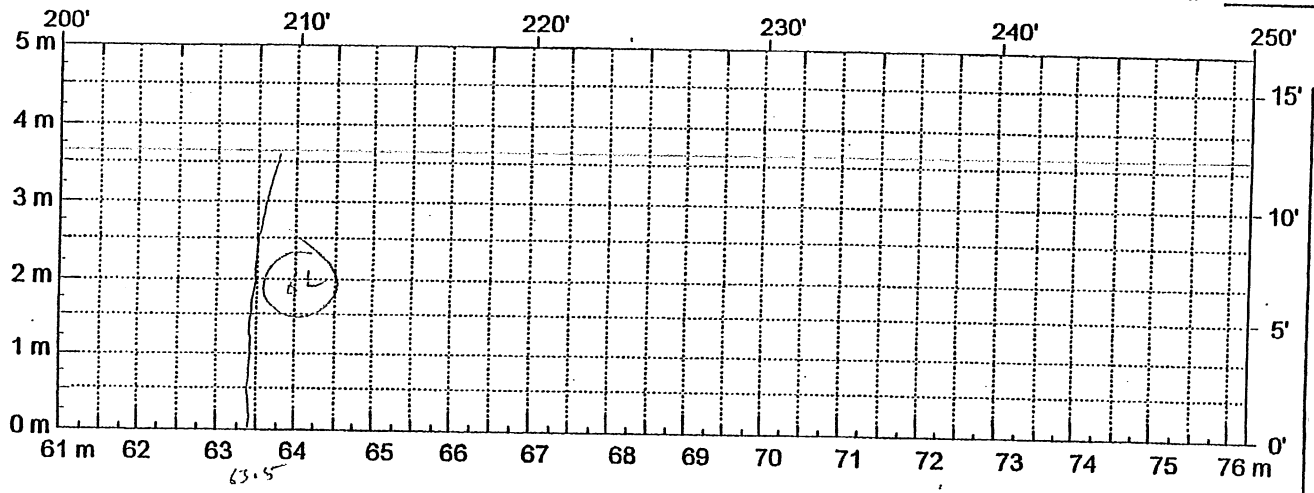
Reviewer: _____ Surveyors: WT (B)

Date: _____ Date: 4/30/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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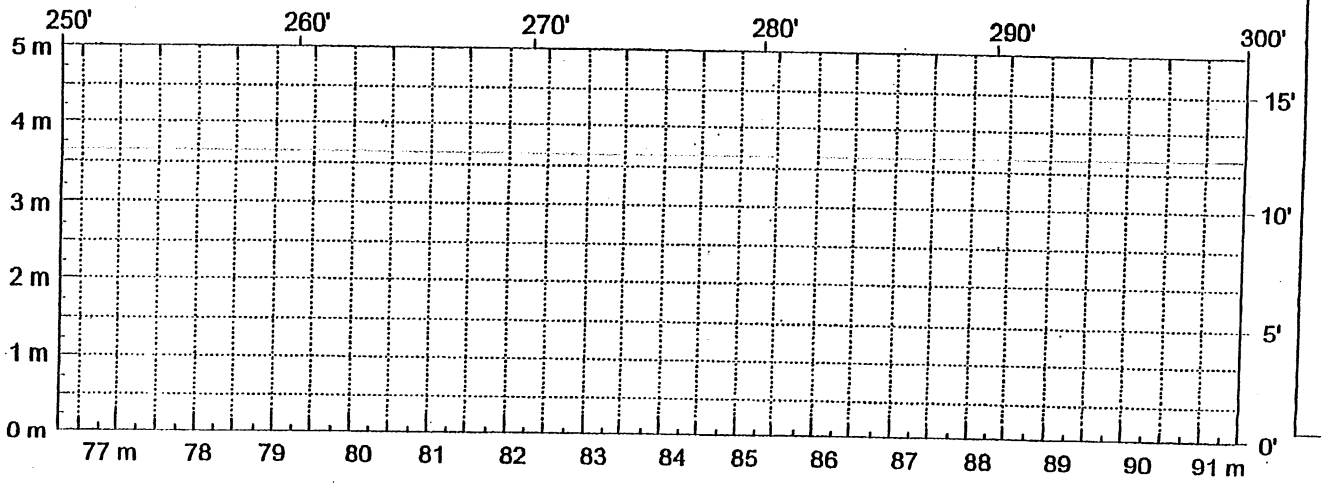


Comments: _____

Sheet Summary

GL = 3.66 m (12')

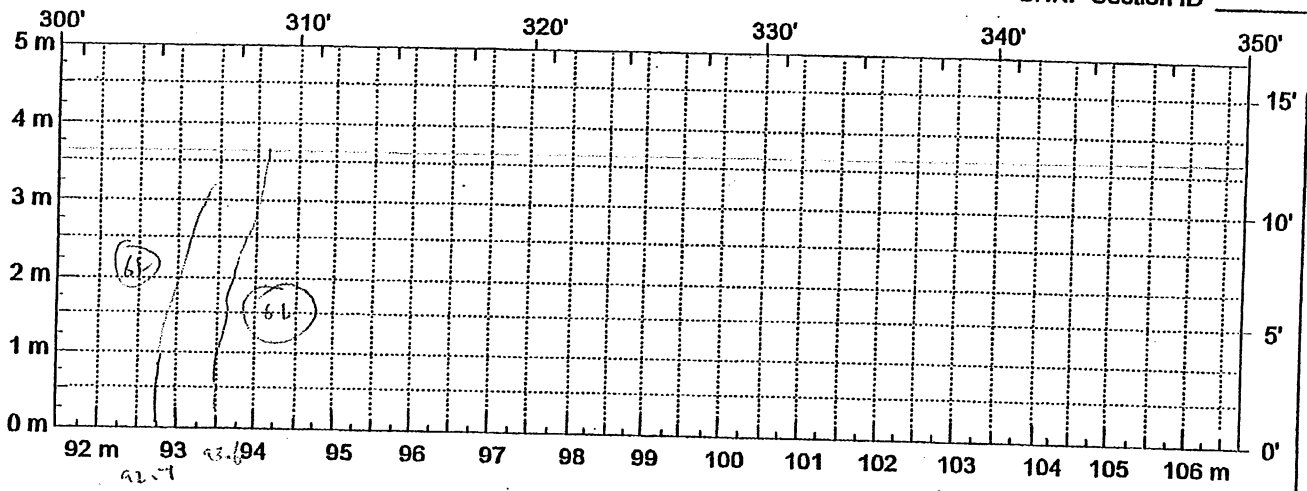
Reviewer: _____ Surveyors: LST | GS

Date: _____ Date: 4/30/02

State Assigned ID _____

State Code _____

SHRP Section ID _____



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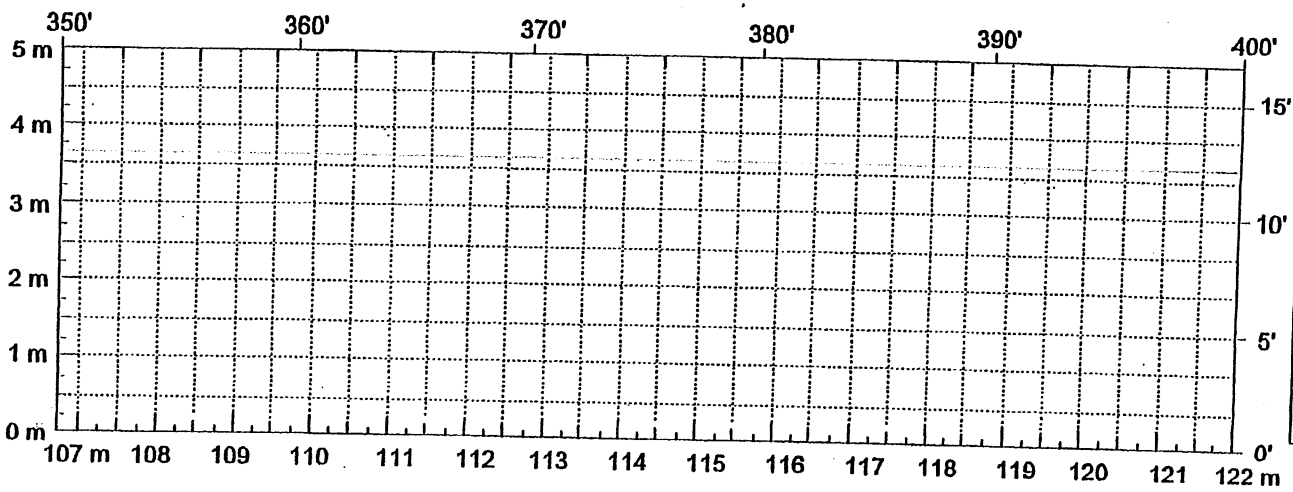


Comments: _____

Sheet Summary

GL = 2.44 + 3.46

= 5.90 GL

Reviewer: _____ Surveyors: LT/BS

Date: _____ Date: 4/30/02

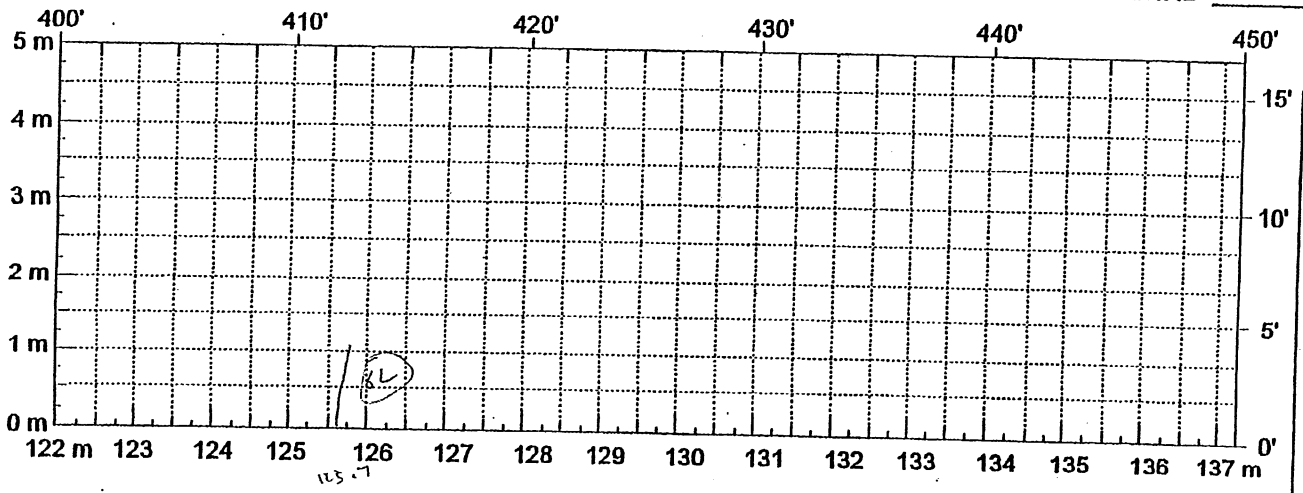
Pavement Temp:

After _____

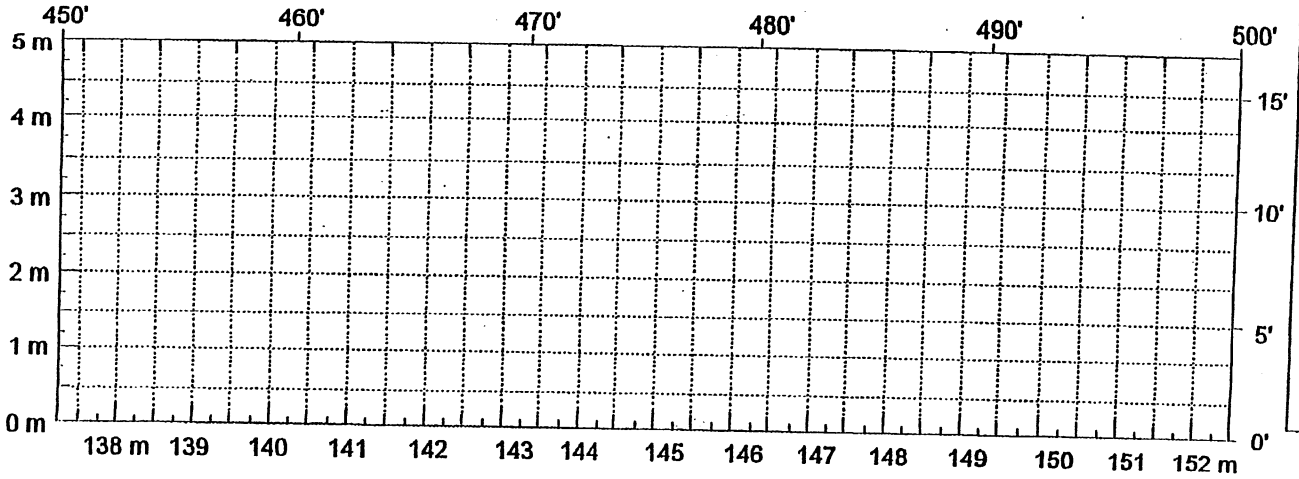
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

RL = height

Montana Performance Prediction Models Contract
Field Data Report

Location: Roundup
Longitude: 108°31' W
Lattitude: 46°27' N

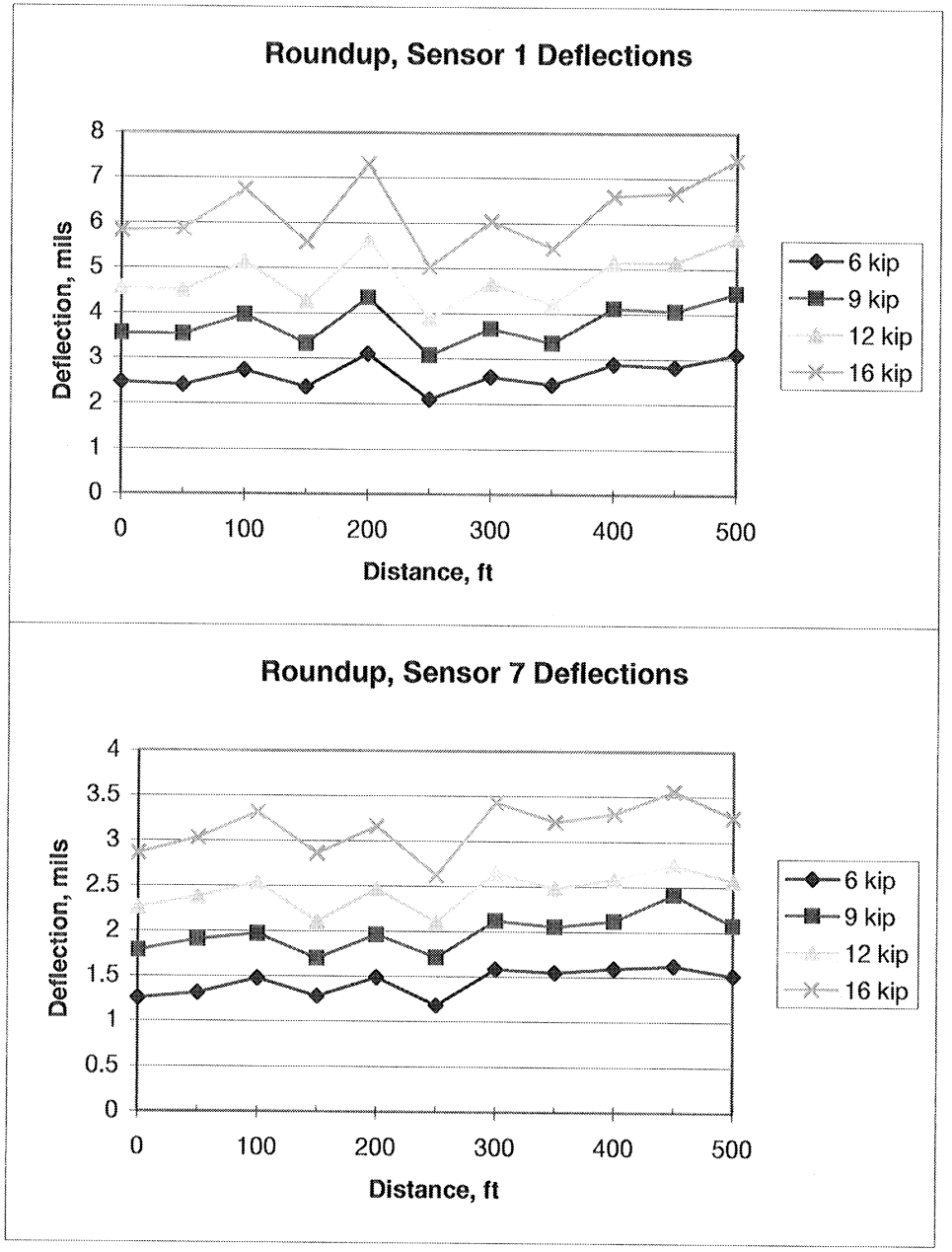
FWD Data

Test Date: 10/9/01

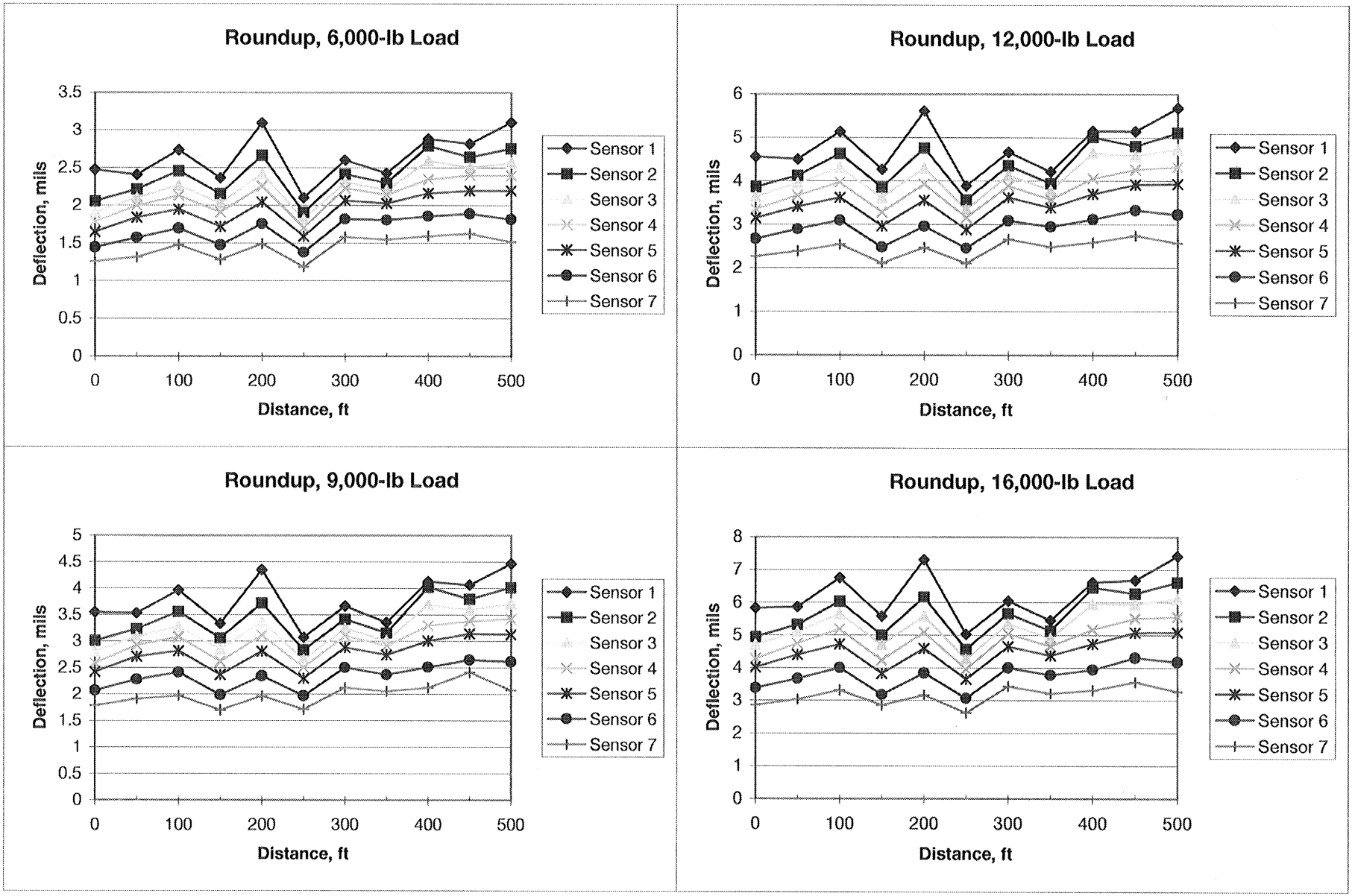
Layer	Material Type	Average Thickness in.
1	ACP	4.3
2	CTB	18.7
3	Subgrade	-

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	7.33	3.02	2.51	2.33	2.18	2.01	1.76	1.53
0+00	11.06	4.36	3.69	3.45	3.18	2.97	2.54	2.19
0+00	13.60	5.16	4.37	4.12	3.79	3.56	3.02	2.56
0+00	15.61	5.68	4.82	4.59	4.16	3.91	3.30	2.79
0+50	7.19	2.88	2.65	2.52	2.39	2.20	1.88	1.57
0+50	10.92	4.28	3.92	3.74	3.54	3.28	2.76	2.31
0+50	13.58	5.09	4.66	4.46	4.14	3.85	3.27	2.69
0+50	15.58	5.71	5.18	4.96	4.61	4.27	3.57	2.95
1+00	7.16	3.26	2.93	2.70	2.54	2.32	2.02	1.76
1+00	10.98	4.83	4.34	4.00	3.76	3.43	2.94	2.40
1+00	13.47	5.76	5.19	4.83	4.45	4.06	3.47	2.85
1+00	15.58	6.57	5.87	5.50	5.04	4.59	3.89	3.23
1+50	7.14	2.81	2.56	2.41	2.27	2.04	1.75	1.52
1+50	11.00	4.07	3.73	3.47	3.19	2.89	2.42	2.07
1+50	13.55	4.81	4.35	4.08	3.70	3.34	2.79	2.38
1+50	15.56	5.42	4.86	4.57	4.11	3.72	3.09	2.78
2+00	7.06	3.64	3.13	2.85	2.65	2.40	2.06	1.75
2+00	10.92	5.27	4.51	4.08	3.77	3.40	2.84	2.38
2+00	13.48	6.30	5.34	4.82	4.41	3.99	3.32	2.77
2+00	15.64	7.14	6.02	5.45	4.97	4.48	3.75	3.09
2+50	7.12	2.49	2.26	2.15	2.02	1.88	1.63	1.40
2+50	10.95	3.73	3.44	3.22	3.04	2.79	2.39	2.08
2+50	13.42	4.34	3.99	3.73	3.53	3.22	2.74	2.35
2+50	15.58	4.89	4.44	4.15	3.85	3.55	2.99	2.55

Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	7.07	3.06	2.84	2.72	2.62	2.43	2.14	1.86
3+00	10.92	4.44	4.14	3.93	3.76	3.49	3.03	2.57
3+00	13.44	5.22	4.87	4.62	4.35	4.05	3.45	2.97
3+00	15.58	5.88	5.51	5.20	4.90	4.52	3.89	3.34
3+50	7.03	2.84	2.69	2.58	2.51	2.37	2.11	1.81
3+50	10.85	4.04	3.80	3.63	3.51	3.30	2.85	2.47
3+50	13.41	4.70	4.40	4.23	3.99	3.78	3.29	2.77
3+50	15.57	5.30	4.99	4.77	4.53	4.25	3.67	3.13
4+00	7.06	3.39	3.28	3.05	2.76	2.54	2.18	1.87
4+00	10.80	4.95	4.82	4.43	3.95	3.60	3.01	2.54
4+00	13.38	5.74	5.58	5.17	4.52	4.12	3.47	2.88
4+00	15.53	6.41	6.26	5.77	5.01	4.58	3.82	3.21
4+50	7.03	3.30	3.09	2.93	2.81	2.57	2.21	1.90
4+50	10.80	4.87	4.55	4.31	4.05	3.76	3.17	2.89
4+50	13.31	5.70	5.32	5.08	4.72	4.34	3.68	3.04
4+50	15.37	6.41	6.02	5.70	5.29	4.87	4.13	3.42
5+00	7.06	3.65	3.24	3.02	2.82	2.58	2.13	1.78
5+00	10.87	5.39	4.85	4.48	4.13	3.77	3.15	2.50
5+00	13.38	6.33	5.69	5.27	4.81	4.38	3.59	2.86
5+00	15.47	7.16	6.39	5.91	5.37	4.91	4.03	3.16


Roundup, Sensor 1 Deflections
Deflection, mils
0
1
2
3
4
5
6
7
8
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip
Roundup, Sensor 7 Deflections
Deflection, mils
0
0.5
1
1.5
2
2.5
3
3.5
4
0
100
200
300
400
500
Distance, ft
6 kip
9 kip
12 kip
16 kip

FWD Deflections



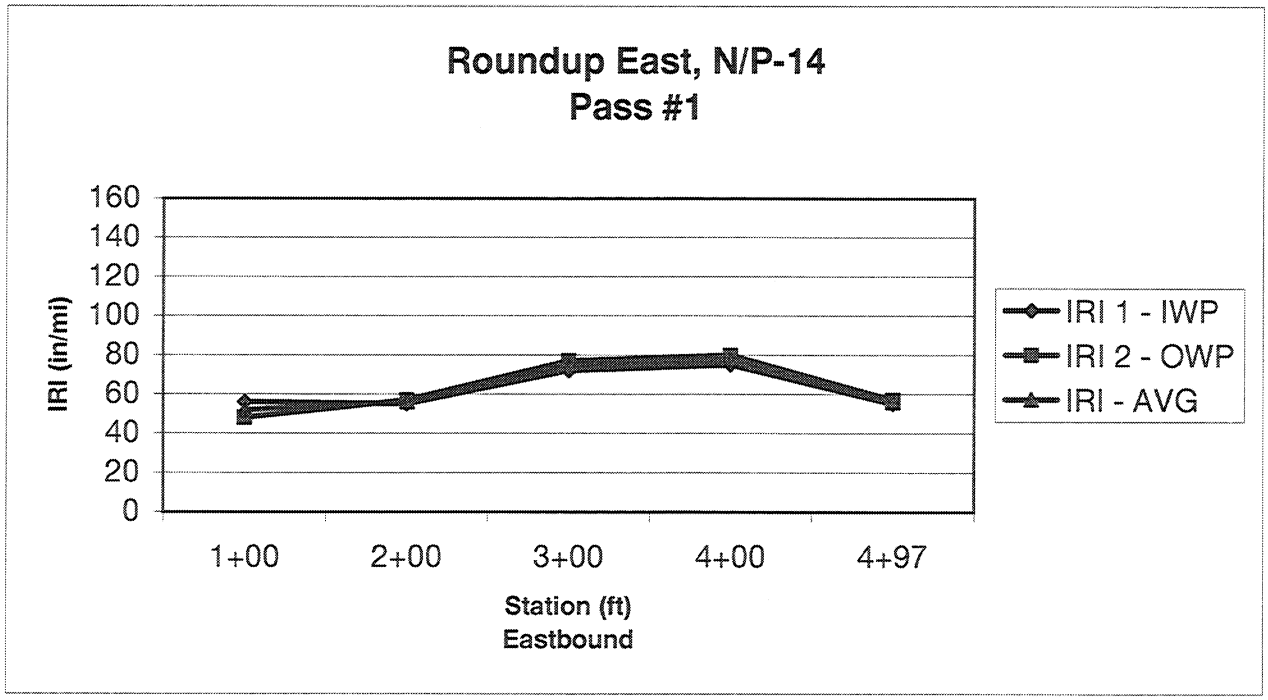
Montana Performance Prediction Models Contract
Field Data Report

Location: Roundup
Longitude: 108°31' W
Lattitude: 46°27' N

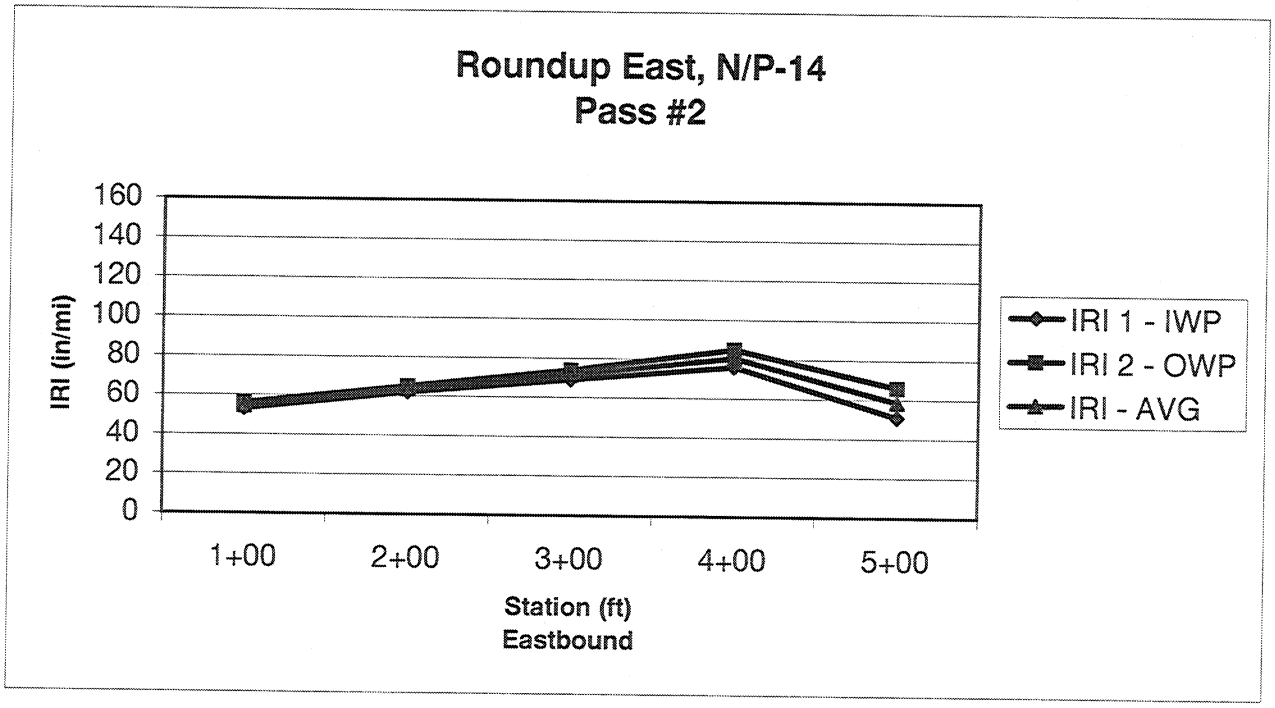
Profile Data

Test Date: 9/27/01

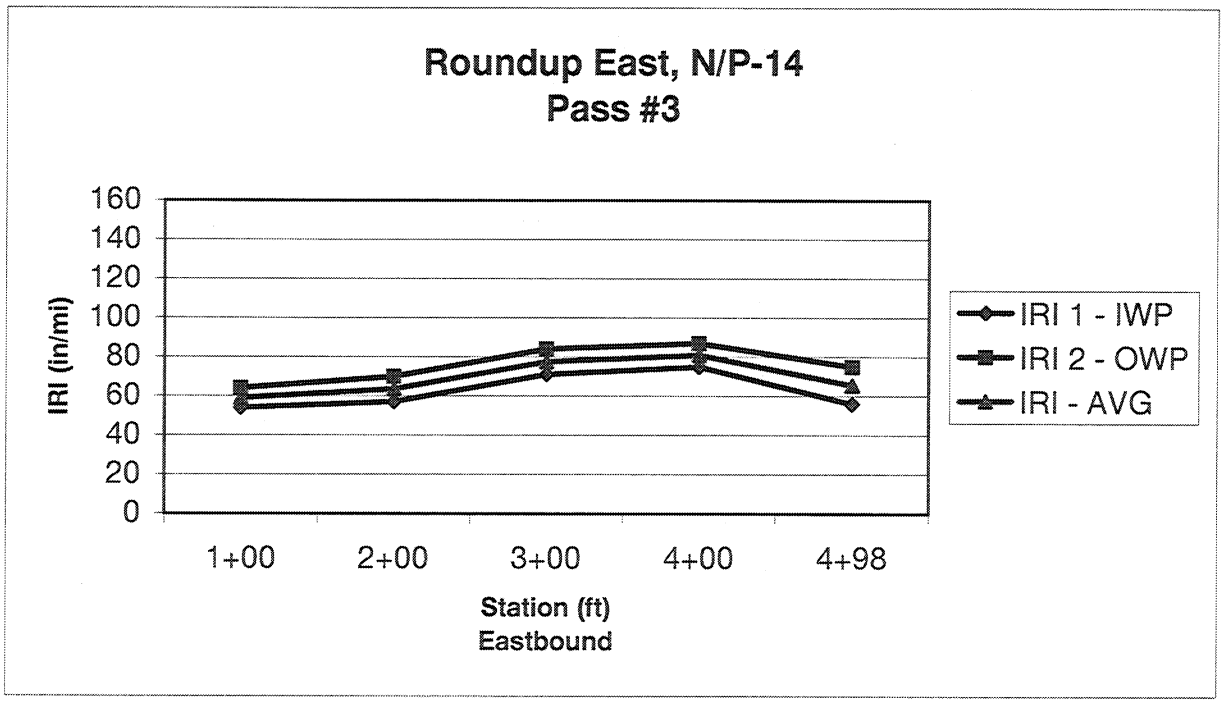
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.03	0.017	56	48	52
2+00	100	200	100	0.04	0.021	55	57	56
3+00	200	300	100	0.05	0.033	72	77	75
4+00	300	400	100	0.02	0.021	75	80	78
4+97	400	497	97	0.04	0.021	55	57	56
AVG.				0.036	0.023	62.6	63.8	63.2
STD.				0.011	0.006	10.015	13.953	11.846



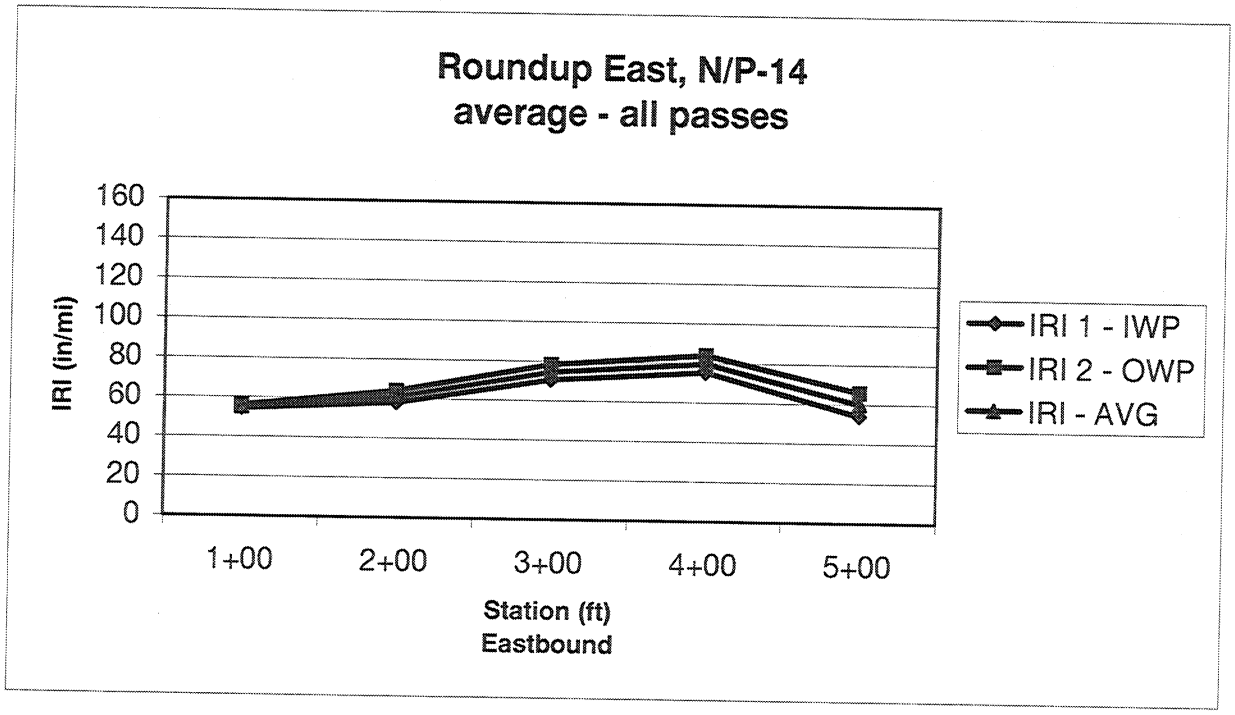
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.03	0.016	53	56	55
2+00	100	200	100	0.02	0.016	62	65	64
3+00	200	300	100	0.05	0.033	69	74	72
4+00	300	400	100	0.03	0.018	76	85	81
5+00	400	500	100	0.04	0.021	51	66	59
AVG.				0.034	0.021	62.2	69.2	65.7
STD.				0.011	0.007	10.569	10.895	10.426



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.03	0.018	54	64	59
2+00	100	200	100	0.03	0.016	57	70	64
3+00	200	300	100	0.05	0.031	71	84	78
4+00	300	400	100	0.03	0.025	75	87	81
4+98	400	498	98	0.03	0.020	56	75	66
AVG.				0.034	0.022	62.6	76	69.3
STD.				0.009	0.006	9.659	9.566	9.464



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.03	0.017	54	56	55
2+00	100	200	100	0.03	0.018	58	64	61
3+00	200	300	100	0.05	0.032	71	78	75
4+00	300	400	100	0.03	0.021	75	84	80
5+00	400	500	100	0.04	0.021	54	66	60
AVG.				0.035	0.022	62.5	69.7	66.1
STD.				0.009	0.006	9.882	11.324	10.457



APPENDIX I

LAVINA

Montana Performance Prediction Models Contract
Field Data Report

Location:	Lavina
Longitude:	109°05' W
Lattitude:	46°18' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	2.6	3.0	2.8	Chip Seal
2	CTB	16.4	14.0	15.2	
3	Subgrade	-	-	-	Olive-Brwn Silty Clay w/ Some Grvl & Very Fine Sand

Materials Sampling

Date: 5/1/02

Material Type	Quantity	Comments
ACP/CTB	14 cores	2-10" & 12-6" cores
CTB	2 bags	ACP/CTB cores
Subgrade	6 bags, 1 shelby	

SHRP REGION _____ SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT SHRP ASSIGNED ID _____

LTPP EXPERIMENT Lavina W ROUTE/HIGHWAY N/P-14 Lane _____ Direction WB

SAMPLE/TEST: (a) Before Section V#1 (b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE

DCG SHEET: 08

OPERATOR Dan M. EQUIPMENT USED _____ SHEET NUMBER ____ OF ____

AUGERING DATE 5 - 1 - 02 LOCATION STATION: RP 139 (E. End) AUGER PROBE NUMBER _____

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	2.5"	PMS	
2	9.5" (7" ^ V)	CTB (Recovered w/core rig)	
	17"	Subgrade olive brn silty clay some V fine sand, gravel	Sample 9.5" - 17"
3			Split Spoon No 17" - 35" Sample 20 Blows → 18"
4			
5	4.5	@ 47" brn silt w/shale gravel fragments	SHELBY TUBE 35" - 47" (Refusal @ 12") 11" Recovered Folded up end
6			
7		brn clayey silt w/gravel	
8			
9	9'	brn silty wkly plast clay	
10			Sample x 2 17" - 35"
11	H_2O 11' 3.5"	brn clayey coarse gravel	
12			Sample 59" - 71"
13			
14			
15			
16			
17			
18			
19			
20	Wet @ bottom		

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR ____-____-19__
Date

SHRP-LTPP
FIELD MATERIAL SAMPLING
AND FIELD TESTING

SHRP REGION _____ STATE CODE _____
STATE MT SHRP ASSIGNED ID _____
LTPP EXPERIMENT Laving W ROUTE/HIGHWAY N/P-14 Lane _____ Direction WB
SAMPLE/TEST: (a) Before Section _____ (b) After Section ✓ #2 FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR Dan M. EQUIPMENT USED _____ DCG SHEET: 08
AUGERING DATE 5 - 1 - 02 LOCATION STATION: RP 139 (W. End) AUGER PROBE NUMBER _____
TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s
NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	2.75"	PMS	
2	9.5" / 7.25"	CTB: ^ Record core V	Sample 9"–20"
3	19.0"	Subgrade	
4	22"	brn silty plastic cly w/abund gravel	Sample #2 20"–32"
5	32"		
6		dk gry-brn interbedded stiff plast. clay and yellow brn silt some gravel	
7			
8		brn clayey silt	Sample 56"–68"
9		grading to brn stiff mod. plastic cly	
10	H2O ▽ 10' 6"		
11	-CAVED-	brn stiff plastic silty clay	
12			
13	Damp @ 13'	clayey coarse gravel	
14			
15			
16			
17			
18			
19			
20		Done 11:13.	

REFUSAL WITHIN 20 FEET (Y/N): N DEPTH TO REFUSAL: _____ (FEET)

CERTIFIED
G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
_____
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
____-____-19__
Date

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: LAVINA

Core Log. No. CL-3-29-02 Hole No. 1

Driller MAYBERRY Crew JOHN SAM Geotech WINDOW-

Date 5/1/02 Drill SIMCO Shelbys _____ # Bag Samples 6 RES

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit F6R

Elev. _____ Water Level _____ Pipe Installed _____

==========

Comments:

==========

0.0-- Asphalt. 0.3	SPT/SHELBYS	PSI	RATE
CTB - 6.5 -	6.5 - 18"	BAG	
LT BROWN SILTY	17" - 35"	SS 21	COUNT
SAND W/S PEA	35" - 42"	SHELBY	
GRAVEL	17" - 35"	BAG - 2	BAGS
	6' BAG SAMPLE		

Project No. 8021 Control No.

Project Name RESEARCH Proj Sta.: LAVINIA

Core Log. No. CL-3-~~09~~30-02 Hole No. 2

Driller MAYBERRY Crew JOHN SAM Geotech WINDOW GREG

Date ~~4/30/02~~ 5-1-00 Drill SIMCO Shelbys ____ # Bag Samples ____

Drilling Method - Augers 8" Casing ____ /Size ____ /Bit F6R

Elev. ____ Water Level 16.0 WHILE DRILLING Pipe Installed ____

Comments:

0.0-- ASPHALT. 0.4	SPT/SHELBYS	PSI	RATE
CTS 8.6 BROWN	9" - 20"	BAG	
FINE SANDY	20" - 32"	2 BAL	SAMPLES
CLAY W/S GRAVEL	32" - 68"	1 BAG	
MORE GRAVEL	DRILLED TO	20'	
TWARDS BOTTOM.	NO SAMPLES.		
20.0			
BOH			

Montana Performance Prediction Models Contract
Field Data Report

Location: Lavina
Longitude: 109°05' W
Lattitude: 46°18' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 5/1/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	39.9	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	29	0	0
	Length (Meters)	100.7	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes			
	(Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Lavina
Longitude: 109°05' W
Lattitude: 46°18' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 5/1/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL
	SURFACE DEFORMATION	N/A
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING	
	(Number)	0
	(Square Meters)	0.0
	SURFACE DEFECTS	
11	BLEEDING	
	(Square Meters)	0.0
12	POLISHED AGGREGATE	
	(Square Meters)	0.0
13	RAVELING	
	(Square Meters)	0.0
	MISCELLANEOUS DISTRESSES	
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING	
	(Number)	0
	Length of Affected Pavement	
	(Meters)	0.0
16	OTHER (Describe) Rutting was measurable on the second half of the section	

Reviewer: _____ Surveyors: WT/RS

Date: _____ Date: 5/1/02

Pavement Temp:

Before_____ After_____

State Assigned ID _____

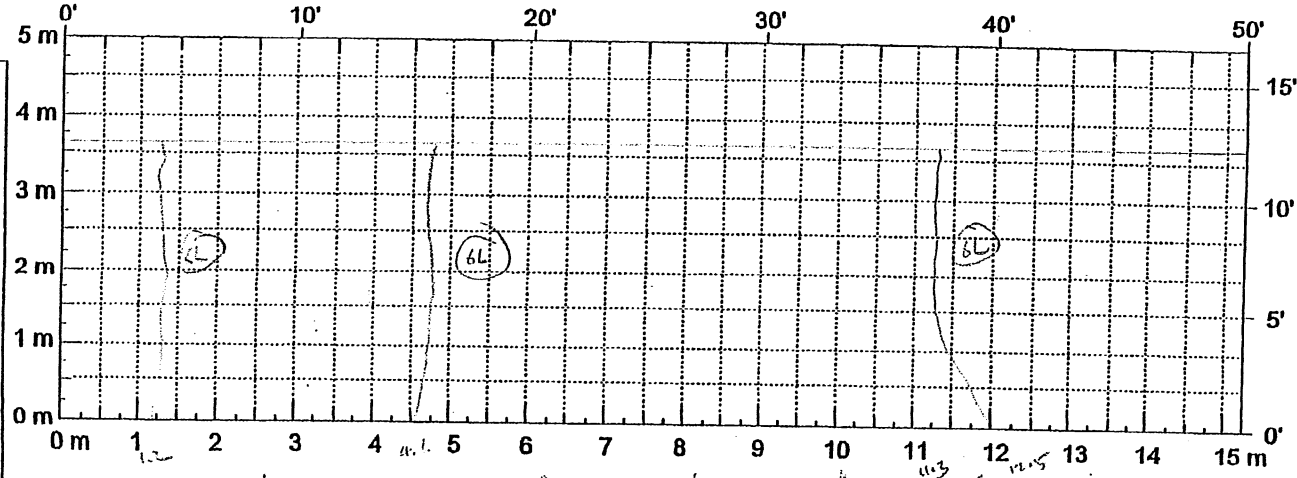
State Code _____

SHRP Section ID _____

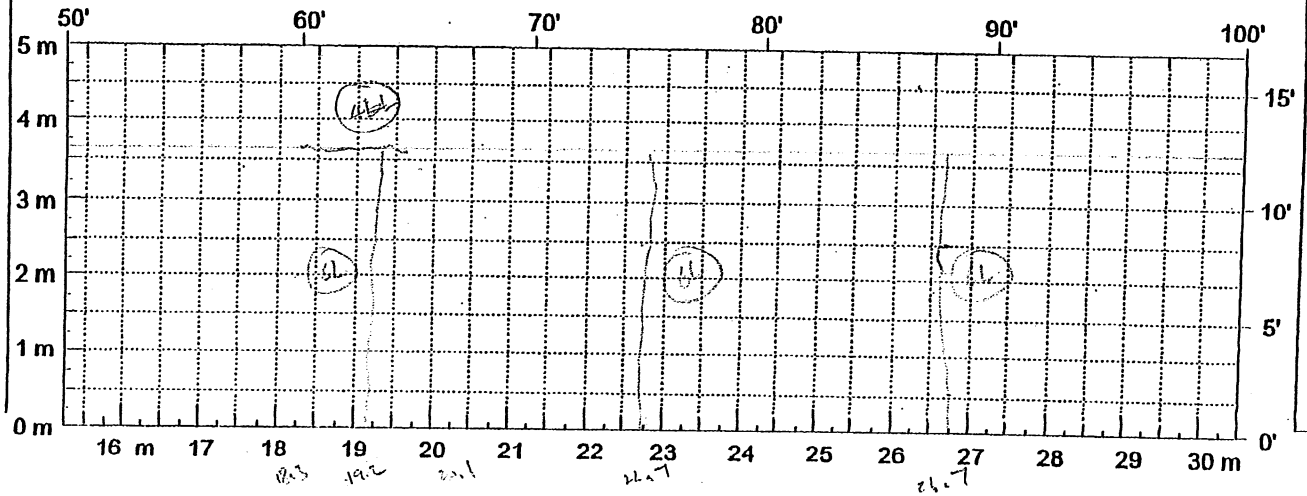
Section Summary

CL = 21.95 (1)
25.62 (7)
18.30 (5)
23.87 (8)
10.97 (3)
100.73 (29)

4&L = 6.8+1.4+0.4
+15.6+20.7
= 39.9 m



Comments: Rutting not measurable in the second half of the section.



Comments: _____

Sheet Summary

CL = 8.6+7.6+3.4+3.6
+5.6+3.6+3.6
= 21.95 m (6)

4&E 1.8 m

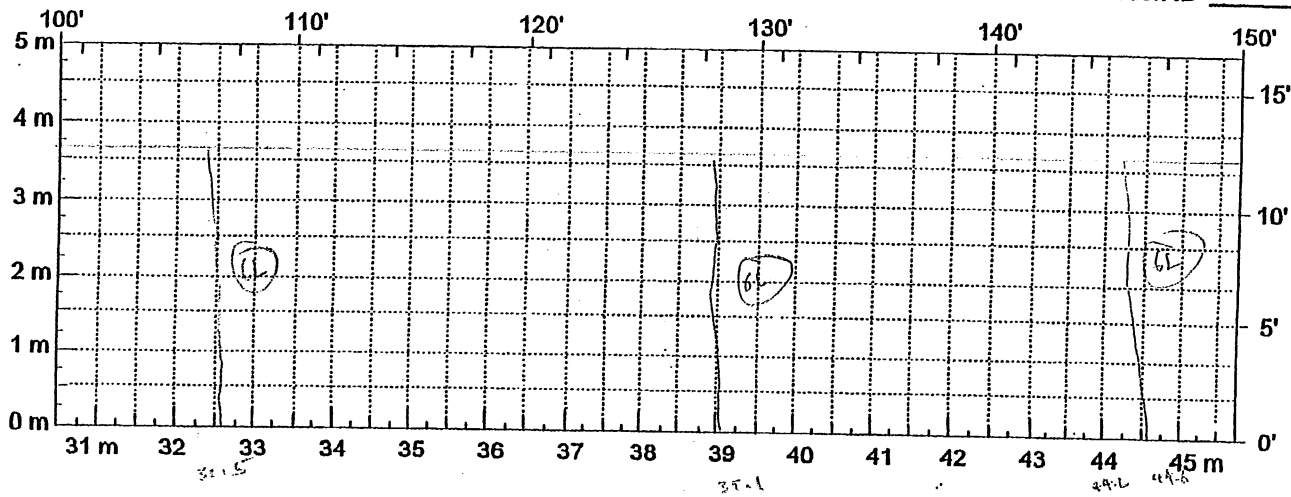
Reviewer: _____ Surveyors: WT (TS)

Date: _____ Date: 5/1/22

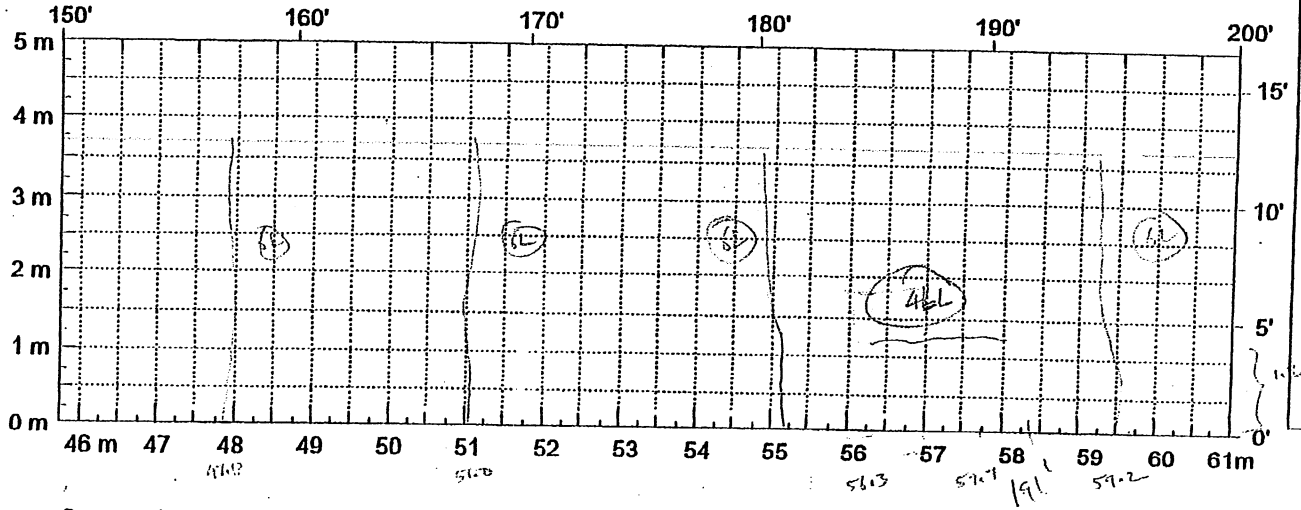
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

6L = 3.66+3.66+3.66
+3.66+3.66+3.66
+3.66
= 25.62 (7)

1 bbl = 1.9m

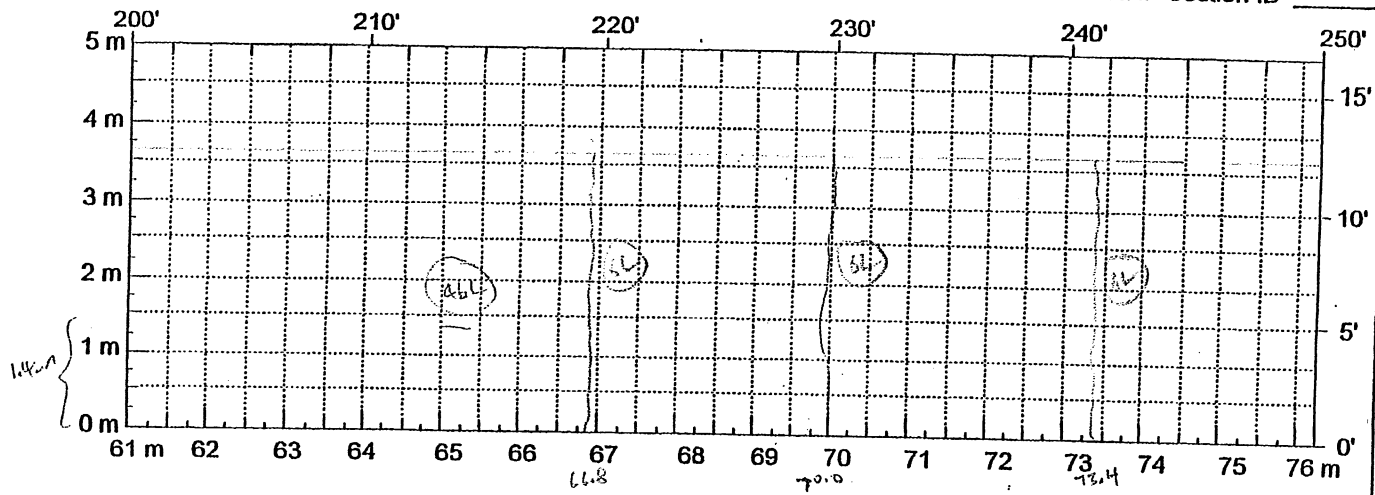
Reviewer: _____ Surveyors: WJ|GS

Date: _____ Date: 5/1/62

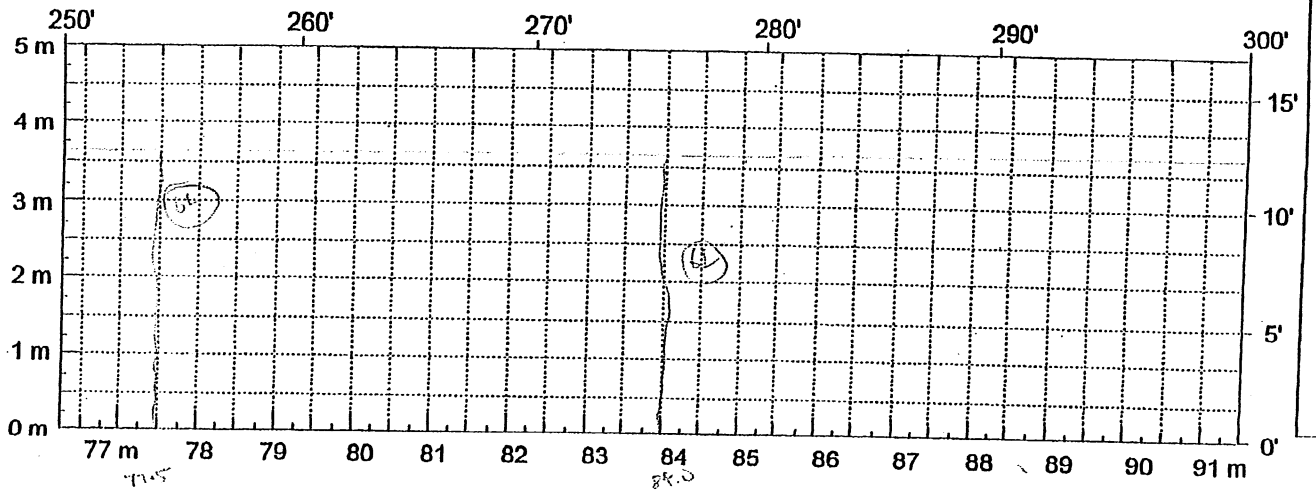
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

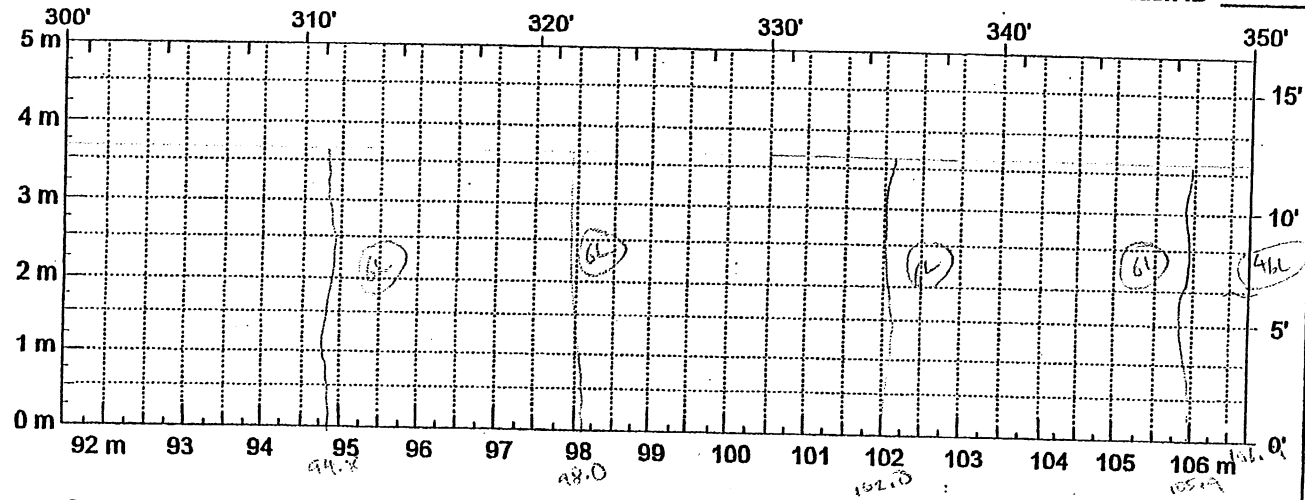
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 5/1/02

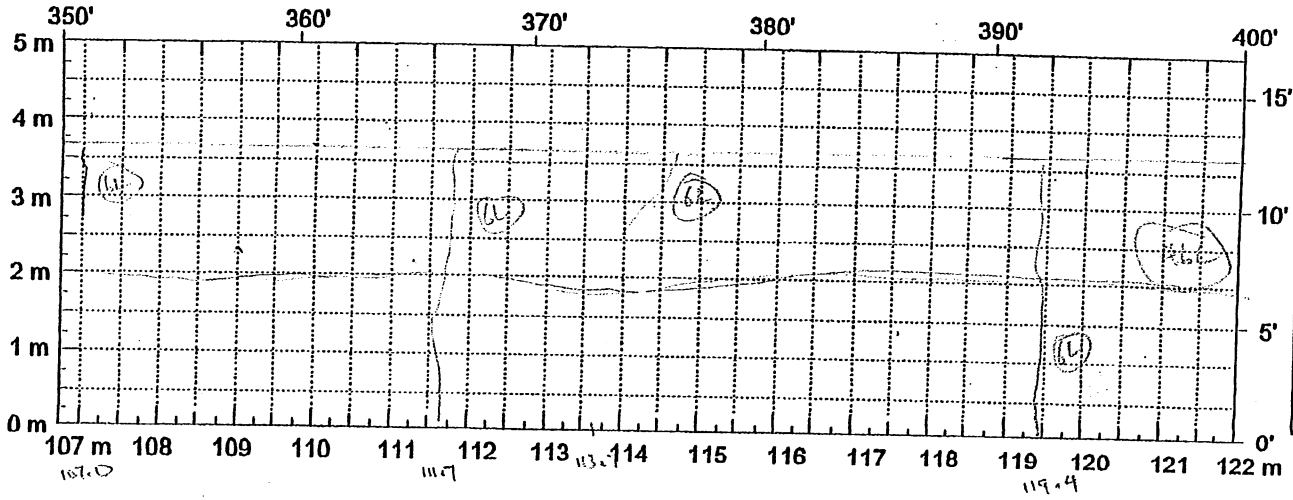
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

Reviewer: _____ Surveyors: ST/BS

Date: _____ Date: 5/1/02

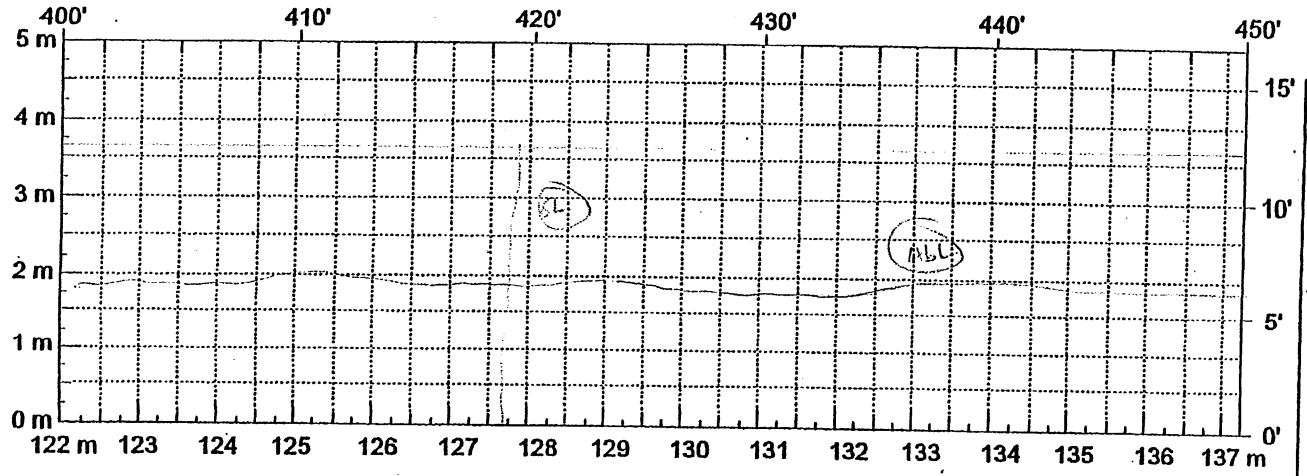
Pavement Temp:

After_____

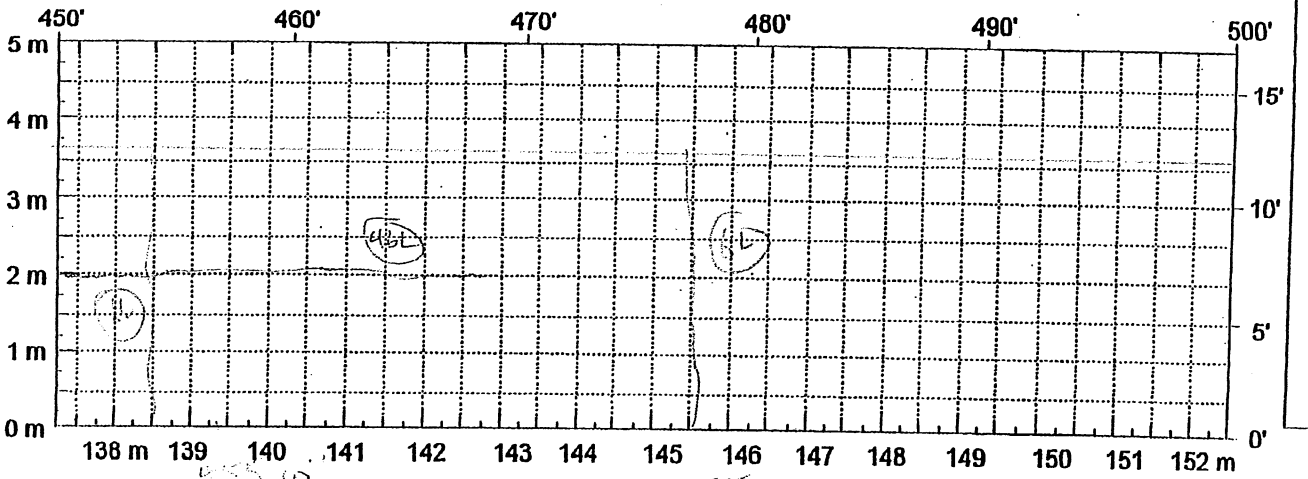
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

LL = 3.66 + 3.66 + 3.56 = 10.88 (3)

ABL = 7.07 m

Montana Performance Prediction Models Contract
Field Data Report

Location: Lavina
Longitude: 109°05' W
Lattitude: 46°18' N

FWD Data

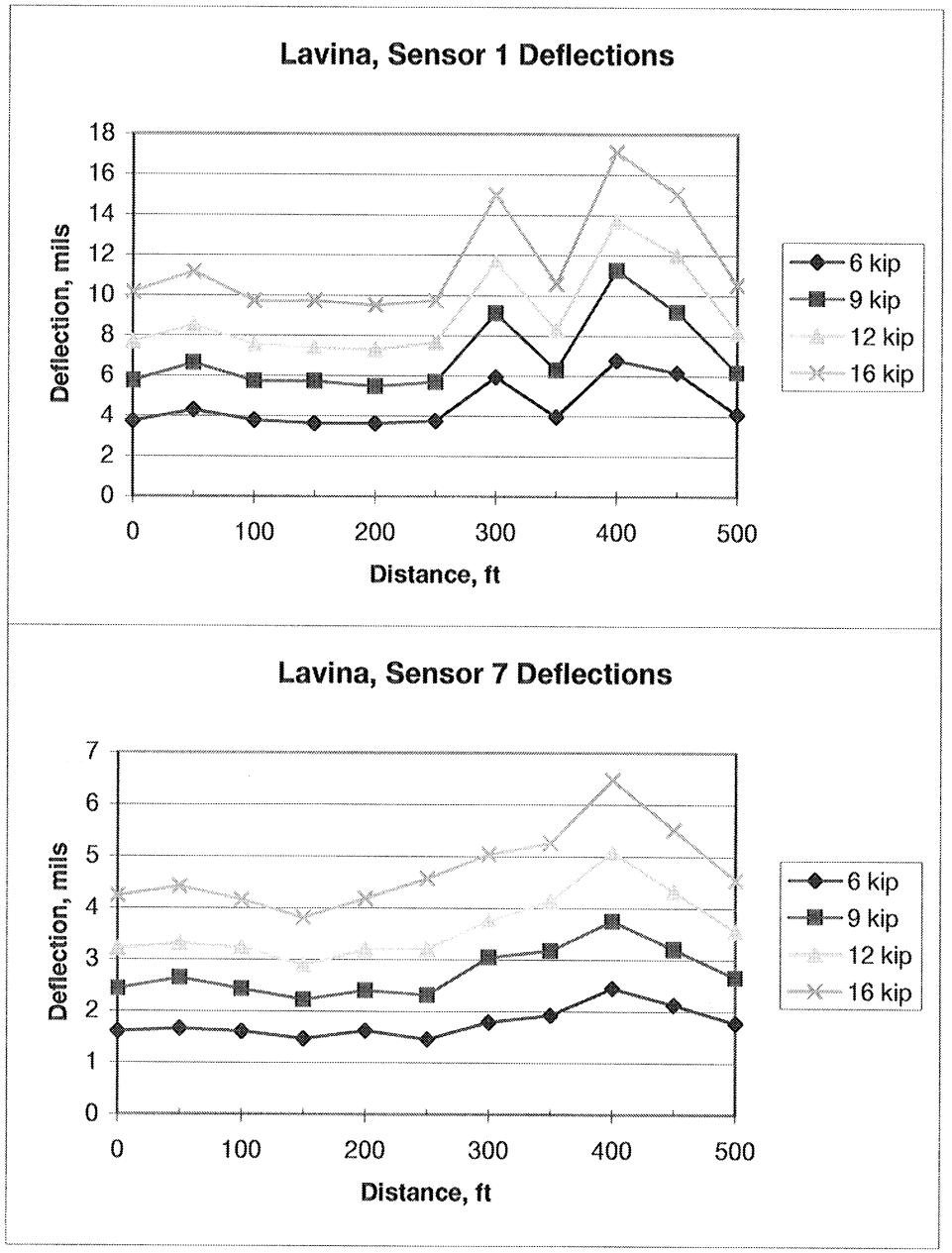
Test Date: 10/10/01

Layer	Material Type	Average Thickness in.
1	ACP	2.8
2	CTB	15.2
3	Subgrade	-

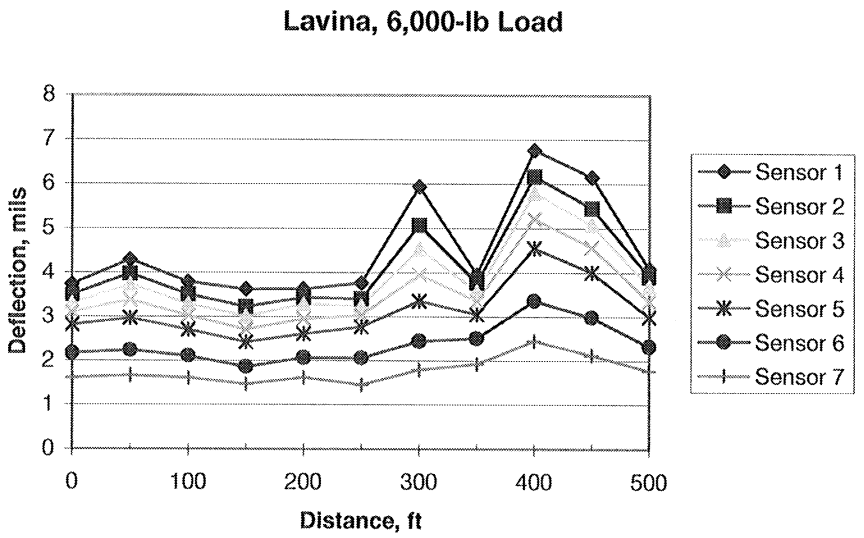
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	6.87	4.27	4.00	3.77	3.54	3.21	2.48	1.84
0+00	9.09	5.79	5.43	5.15	4.75	4.34	3.33	2.46
0+00	11.49	7.37	6.89	6.54	6.05	5.51	4.22	3.08
0+00	15.31	9.73	9.12	8.70	7.96	7.26	5.52	4.05
0+50	6.80	4.86	4.50	4.22	3.82	3.35	2.53	1.88
0+50	8.99	6.61	6.19	5.79	5.30	4.66	3.57	2.64
0+50	11.50	8.16	7.63	7.14	6.44	5.71	4.30	3.17
0+50	15.33	10.70	10.04	9.43	8.48	7.53	5.73	4.23
1+00	6.83	4.30	3.98	3.74	3.43	3.07	2.39	1.83
1+00	9.01	5.72	5.31	4.99	4.57	4.09	3.20	2.43
1+00	11.46	7.21	6.71	6.28	5.86	5.19	4.05	3.09
1+00	15.24	9.26	8.70	8.21	7.49	6.72	5.24	3.96
1+50	6.85	4.13	3.67	3.43	3.09	2.76	2.12	1.67
1+50	9.11	5.78	5.08	4.76	4.30	3.82	2.96	2.25
1+50	11.49	7.07	6.24	5.85	5.27	4.68	3.64	2.77
1+50	15.47	9.40	8.36	7.83	7.07	6.29	4.82	3.68
2+00	6.87	4.15	3.92	3.75	3.37	2.98	2.36	1.85
2+00	9.04	5.49	5.20	4.90	4.44	3.93	3.12	2.41
2+00	11.58	7.04	6.64	6.33	5.63	5.02	3.98	3.08
2+00	15.31	9.10	8.66	8.22	7.29	6.48	5.14	4.00
2+50	6.69	4.19	3.79	3.60	3.37	3.08	2.29	1.62
2+50	8.79	5.55	5.10	4.85	4.55	4.15	3.09	2.26
2+50	11.24	7.17	6.63	6.25	5.88	5.36	3.99	3.00
2+50	15.08	9.19	8.53	8.08	7.53	6.84	5.10	4.31

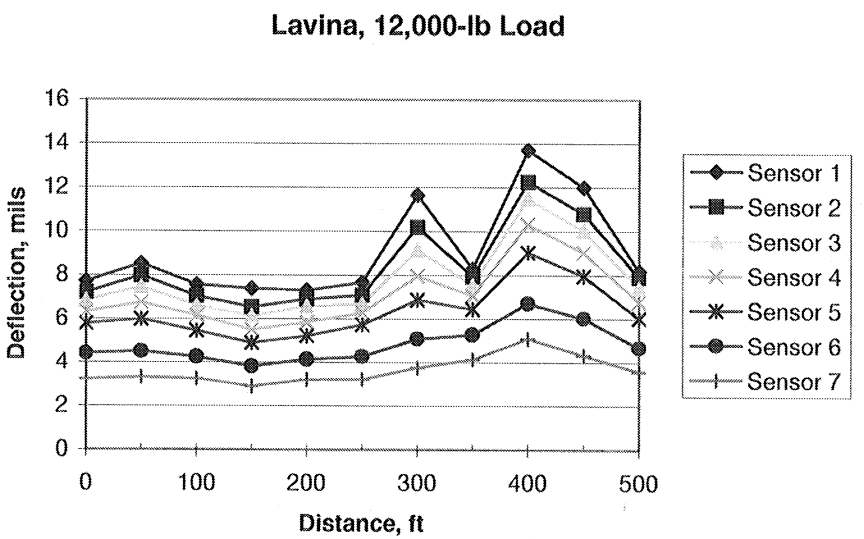
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
3+00	6.74	6.67	5.69	5.09	4.43	3.76	2.74	2.01
3+00	8.95	9.06	7.85	7.07	6.18	5.32	4.00	3.03
3+00	11.30	10.97	9.59	8.60	7.49	6.45	4.78	3.53
3+00	15.11	14.16	12.45	11.25	9.77	8.46	6.30	4.76
3+50	6.72	4.43	4.21	3.99	3.75	3.41	2.80	2.15
3+50	8.94	6.24	5.91	5.64	5.34	4.84	4.00	3.15
3+50	11.39	7.87	7.53	7.14	6.69	6.11	5.00	3.92
3+50	15.20	10.07	9.71	9.12	8.52	7.79	6.38	5.00
4+00	6.15	6.93	6.32	5.94	5.34	4.66	3.44	2.51
4+00	8.26	10.33	8.53	7.98	7.22	6.26	4.62	3.44
4+00	10.48	11.96	10.70	10.03	9.00	7.89	5.85	4.44
4+00	13.98	14.96	13.65	12.67	11.42	9.92	7.43	5.66
4+50	6.73	6.90	6.12	5.69	5.12	4.48	3.34	2.38
4+50	8.93	9.11	8.14	7.55	6.79	5.96	4.49	3.18
4+50	11.27	11.27	10.14	9.40	8.48	7.46	5.65	4.06
4+50	15.34	14.42	13.12	12.15	10.93	9.65	7.38	5.29
5+00	6.79	4.61	4.42	4.16	3.79	3.38	2.63	2.00
5+00	8.98	6.16	5.95	5.61	5.11	4.53	3.49	2.65
5+00	11.38	7.74	7.48	7.01	6.42	5.70	4.42	3.37
5+00	15.40	10.13	9.87	9.29	8.41	7.45	5.76	4.37

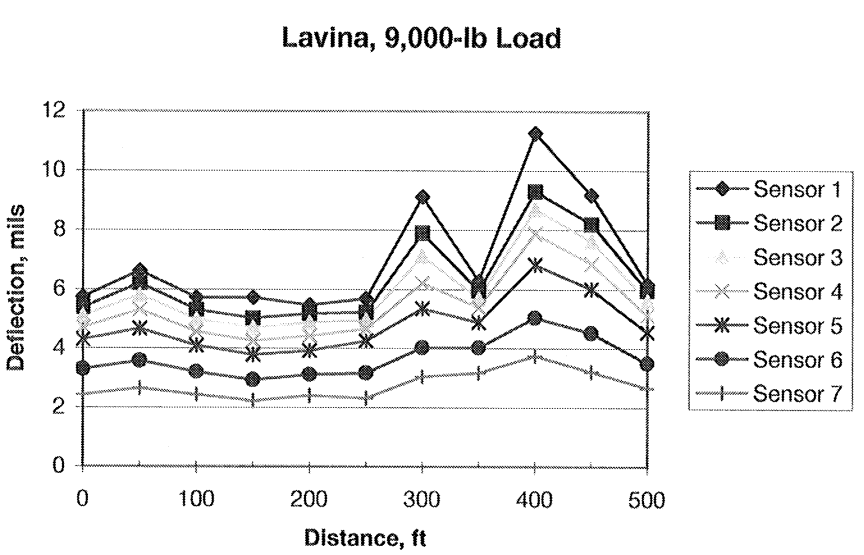
FWD Deflections

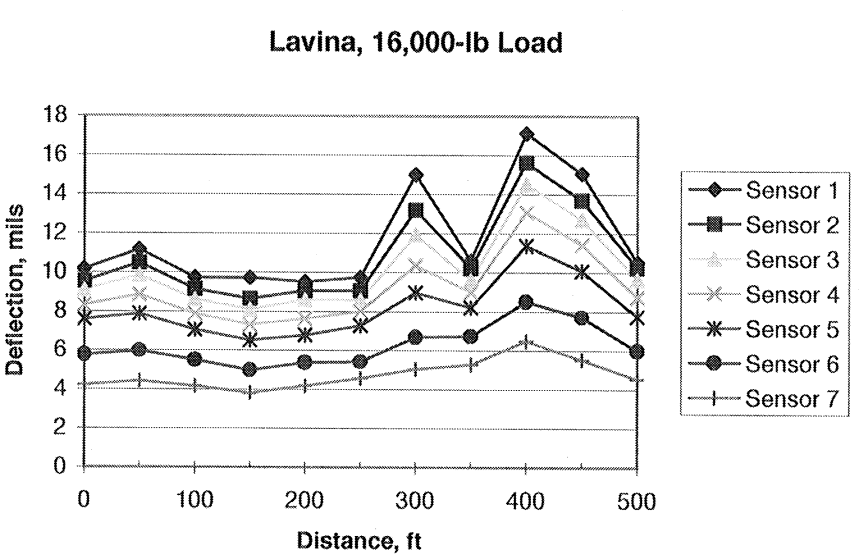


FWD Deflections









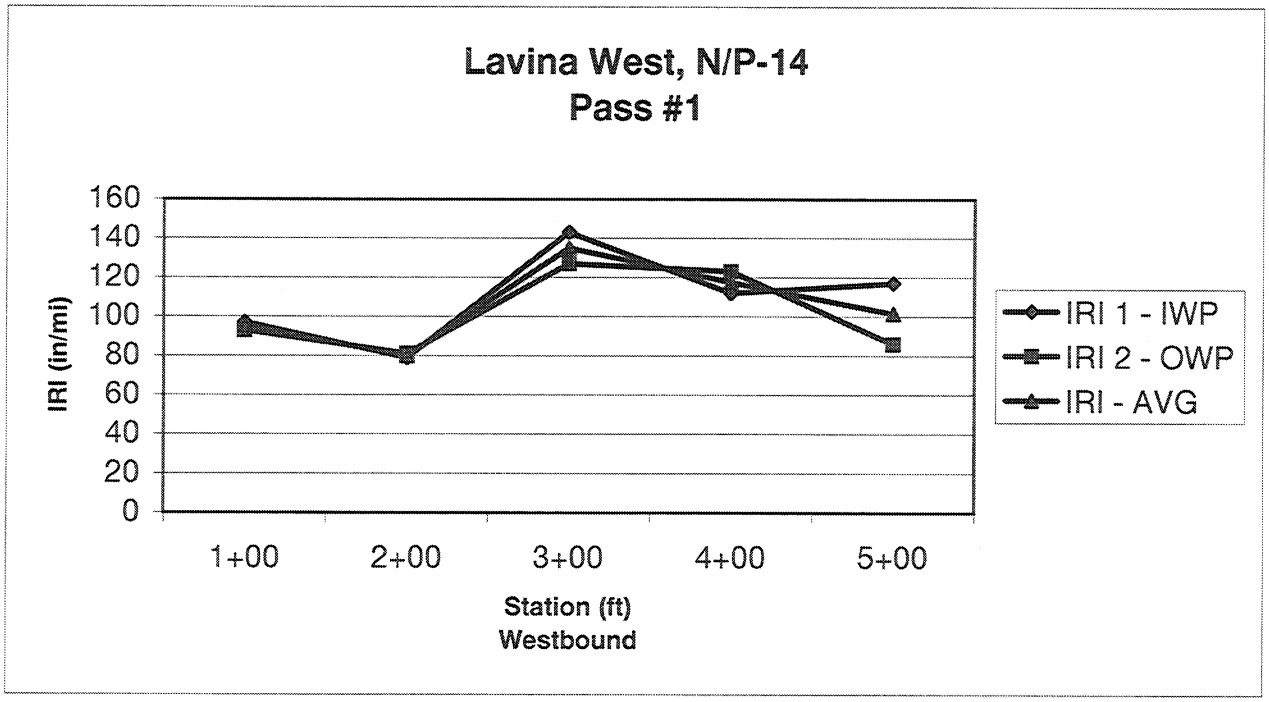
Montana Performance Prediction Models Contract
Field Data Report

Location: Lavina
Longitude: 109°05' W
Lattitude: 46°18' N

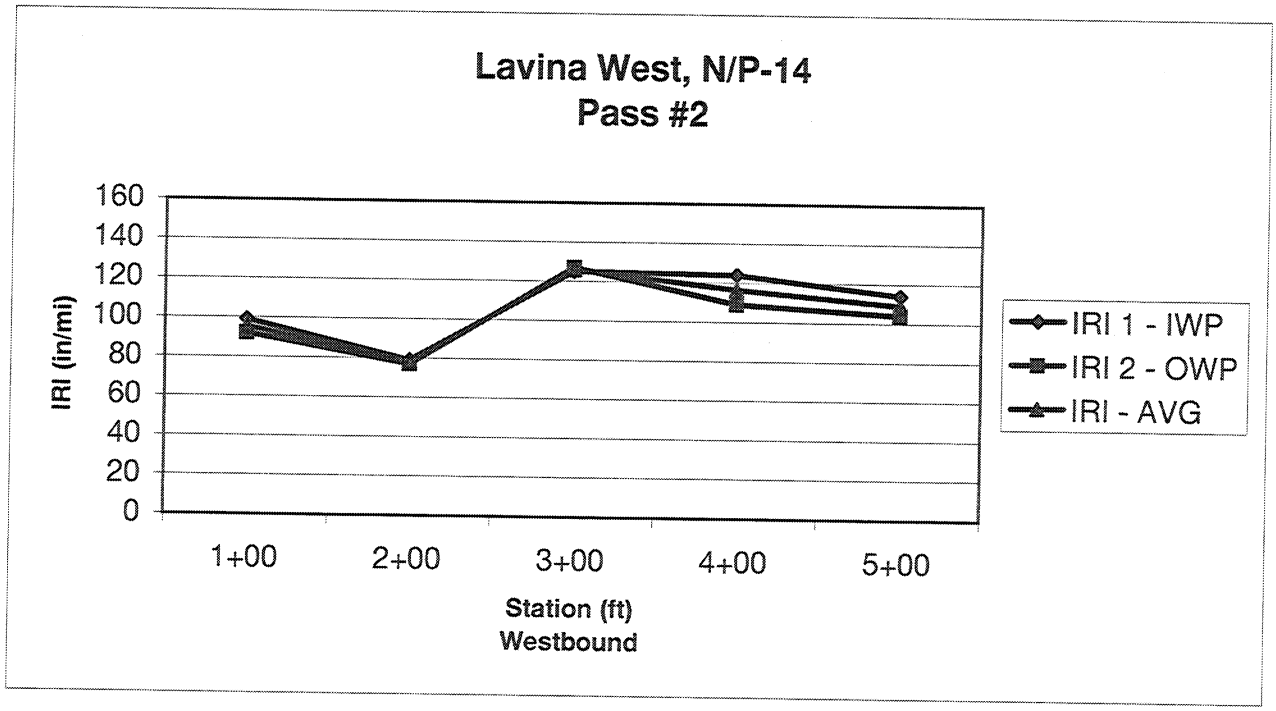
Profile Data

Test Date: 9/27/01

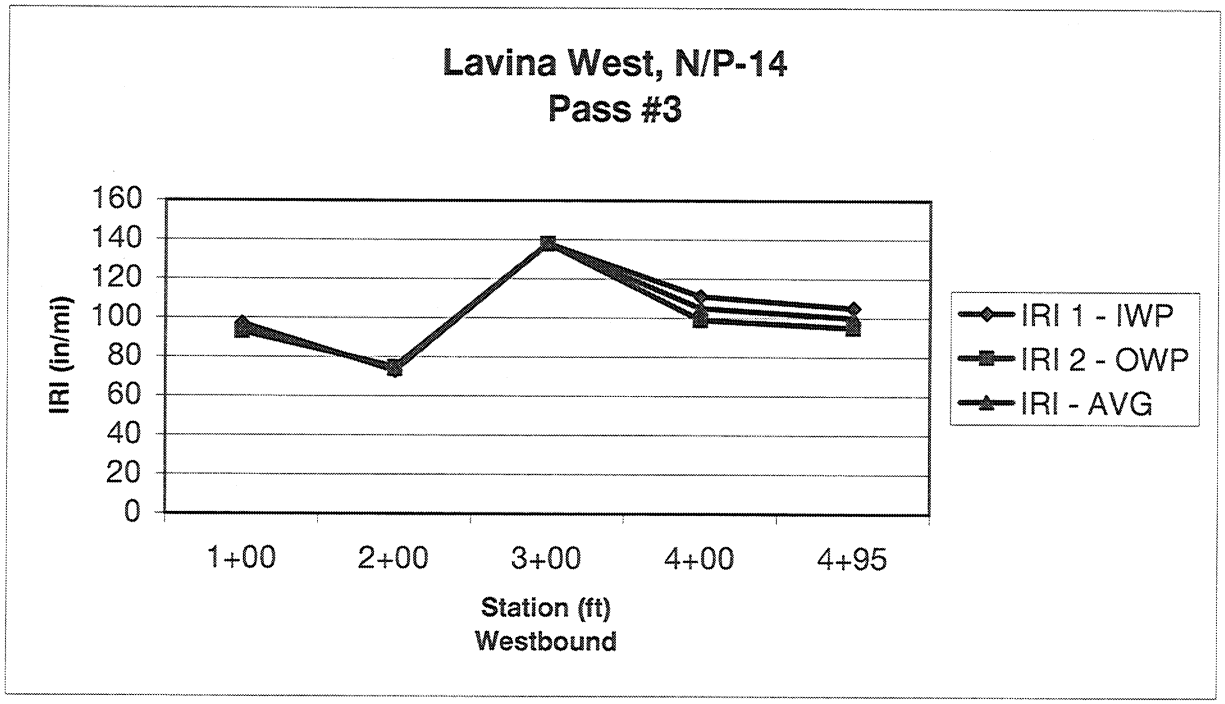
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.17	0.046	97	93	95
2+00	100	200	100	0.15	0.049	79	81	80
3+00	200	300	100	0.11	0.062	143	127	135
4+00	300	400	100	0.14	0.106	112	123	118
5+00	400	500	100	0.27	0.072	117	86	102
AVG.				0.168	0.067	109.6	102.0	105.8
STD.				0.061	0.024	23.829	21.471	21.156



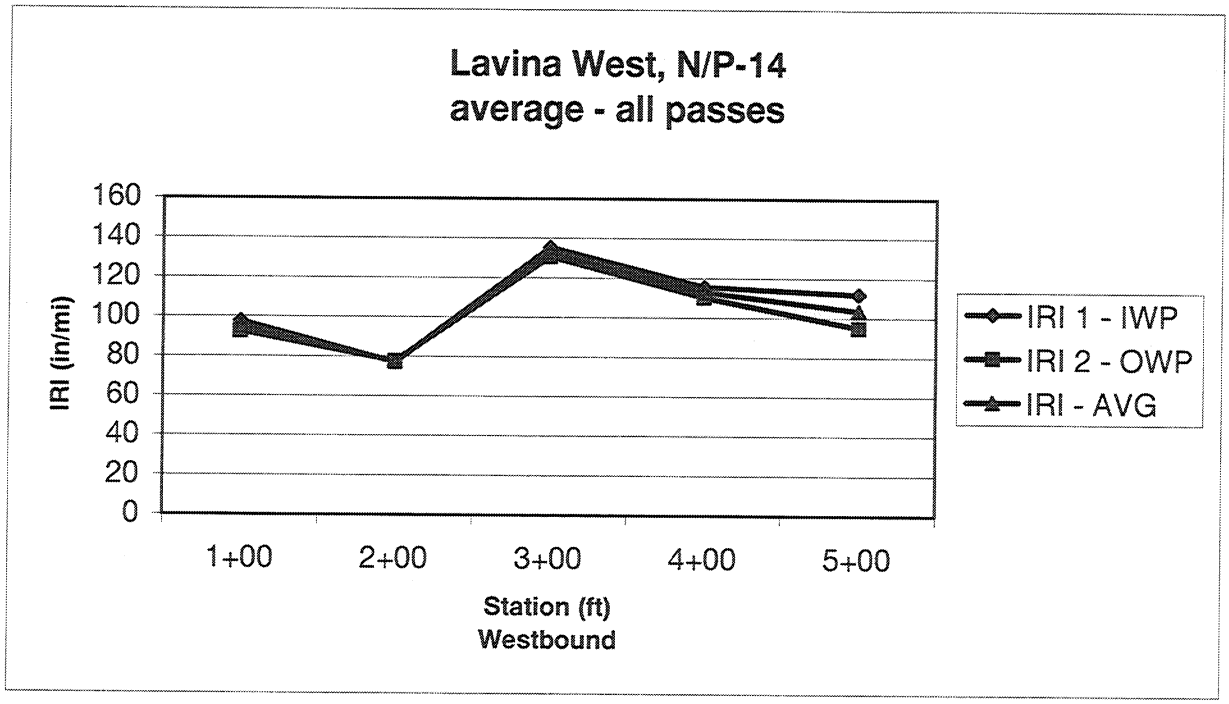
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.17	0.045	99	92	96
2+00	100	200	100	0.14	0.056	79	77	78
3+00	200	300	100	0.11	0.058	125	127	126
4+00	300	400	100	0.16	0.110	124	109	117
5+00	400	500	100	0.26	0.079	114	104	109
AVG.				0.168	0.070	108.2	101.8	105.0
STD.				0.056	0.026	19.383	18.727	18.765



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.15	0.042	97	93	95
2+00	100	200	100	0.16	0.054	73	75	74
3+00	200	300	100	0.10	0.048	138	138	138
4+00	300	400	100	0.16	0.117	111	99	105
4+95	400	495	95	0.24	0.090	105	95	100
AVG.				0.162	0.070	104.8	100.0	102.4
STD.				0.050	0.032	23.520	23.152	23.137



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.16	0.044	98	93	95
2+00	100	200	100	0.15	0.053	77	78	77
3+00	200	300	100	0.11	0.056	135	131	133
4+00	300	400	100	0.15	0.111	116	110	113
5+00	400	500	100	0.26	0.080	112	95	104
AVG.				0.166	0.069	107.5	101.3	104.4
STD.				0.055	0.027	21.729	20.104	20.680



APPENDIX J

GEYSER

Montana Performance Prediction Models Contract
Field Data Report

Location:	Geyser
Longitude:	110°28' W
Lattitude:	47°14' N

Pavement Structure

Date: March 2002

		Thickness, in			
Layer #	Material Type	Before	After	Average	Commets
1	ACP	3.9	4.3	4.1	Chip Seal
2	CSB	11.6	11.2	11.4	
3	Base	24.5	26.5	25.5	Brown Clayey-Sandy Gravel
4	Subgrade	-	-	-	Dark Brown Stiff Plastic Clay w/ Some Gravel

Materials Sampling

Date: 5/2/02

Material Type	Quantity	Comments
ACP/CSB	14 cores	2-10" & 12-6" cores
Base	2 bags	
Subgrade	6 bags	

SHRP REGION _____ SHRP-LTPP STATE CODE _____

STATE MT FIELD MATERIAL SAMPLING

LTPP EXPERIMENT Geuser E AND FIELD TESTING SHRP ASSIGNED ID _____

SAMPLE/TEST: (a) Before Section V #1 ROUTE/HIGHWAY P-57 Lane _____ Direction WB

(b) After Section _____ FIELD SET NO. _____

LOG OF SHOULDER PROBE

OPERATOR _____ EQUIPMENT USED _____ DCG SHEET: 08

AUGERING DATE 5 - 2 - 02 LOCATION STATION: RP-23 (E. Side) SHEET NUMBER 1 OF 1

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s AUGER PROBE NUMBER _____

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	3.5"	PMS	
2	15.5" 13"	CTB Recov'd w/core	
3	32"	Exist. Base brn clayey coarse gravel	Split spoon 84 blows 18" Sample 15" – 32"
4	40"	Exist. Base? brn clayey sand w/ gravel	
5			
6	5.5'	dk brn stiff highly plastic cly some gravel Subgrade	
7	7.0'		Sample x 2 40" – 59"
8		brn sandy gravel	
9			
10		dk brn stiff plastic sandy Cly w/ gravel	84" – [illegible]
11	10.5'		
12	EOH	V coarse gravel / boulders REFUSAL	
13			
14			
15			
16			
17			
18			
19			
20			

REFUSAL WITHIN 20 FEET (Y/N): Y DEPTH TO REFUSAL: 10.5' (FEET)

CERTIFIED G. Zeiher
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
_____ - _____ -19__
Date

SHRP REGION _____ SHRP-LTPP FIELD MATERIAL SAMPLING AND FIELD TESTING STATE CODE _____

STATE MT SHRP ASSIGNED ID _____

LTPP EXPERIMENT Geyser E ROUTE/HIGHWAY P-57 Lane _____ Direction WB

SAMPLE/TEST: (a) Before Section _____ (b) After Section V #2 FIELD SET NO. _____

LOG OF SHOULDER PROBE DCG SHEET: 08

OPERATOR Don M. EQUIPMENT USED _____ SHEET NUMBER 1 OF 1

AUGERING DATE 5-2-02 LOCATION STATION: RP-23 (W. Side) AUGER PROBE NUMBER _____

TOP OF ROCK BASED ON: _____ OFFSET: _____ feet from °/s

NOTE: SHOULDER AUGER PROBE IS AN OPTIONAL ITEM, AS DIRECTED BY SAR.

Scale (feet)	Depth from Surface (Feet)	Material Description	Material Code
1	4.5"	PMS	
	15.5" (11")	CTB	
2			
	28"	brn sandy clayey gravel Existe Base	Sample 15.5"-28"
3			
	35"		Split Spoon 35"-53"
4	42"		39 blows
5		brn clyey gravel/gravelly clay Subgrade	
6	6'		Sample 44"-54"
7			
8		dk brn-brn stiff plast clay w/ some coouse sand	Sample 78"-90"
9	9'		
10	EOH	Coarse gravel, cobbles & boulders	
11		Refusal	
12			
13			
14			
15			
16			
17			
18			
19			
20	Done 10:54		

REFUSAL WITHIN 20 FEET (Y/N): Y DEPTH TO REFUSAL: 9' (FEET)

CERTIFIED G. Zeihen
Crew Chief, Contractor
Affiliation: MDT

VERIFIED AND APPROVED
SHRP Representative
Affiliation: _____

MONTH-DAY-YEAR
__-__-19__
Date

Project No. 8021 Control No. _____

Project Name RESEARCH PROJ Sta.: GEYSER

Core Log. No. CL-3-30-02 Hole No. 1

Driller MAYBERRY Crew JOHN SAM Geotech WING ON & GREG

Date 5/2/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FINGER

Elev. _____ Water Level _____ Pipe Installed _____

Comments:

0.0-- ASPHALT 0.2	SPT/SHELBYS	PSI	RATE
CTB - 15"	15" - 33"	55	
GRAVEL - SANDY	15" - 32"	BAG	
BROWN GRAVEL	40" - 59"	2 BAGS	
70" BROWN	7.5 - 8.0	BAG	
CLAY - 5.5	DRILLED TO	105	
SANDY BROWN	AUGER	REFUSAL	
GRAVEL 10.5			
BOH			

Project No. 8021 Control No. _____

Project Name RESEARCH Proj Sta.: GEYSER

Core Log. No. CL-3-32-02 Hole No. 2

Driller MAYBERRY Crew JOHN SAM Geotech WING OW GREG

Date 5/2/02 Drill SIMCO Shelbys _____ # Bag Samples _____

Drilling Method - Augers 8" Casing _____ /Size _____ /Bit FINGER

Elev. _____ Water Level _____ Pipe Installed _____

==========

Comments:

==========

0.0-- ASPHALT 0.45	SPT/SHELBYS	PSI	RATE
CTB 1'	15" - 28"	BAG	
GRAVEL BROWN	3.0' - 4.5	SS	36 GOOD
SANDY GRAVEL	42" - 44"	BAG	
W/S CLAY	42" - 52"	BAG	
10.0			
BOH			

Montana Performance Prediction Models Contract
Field Data Report

Location: Geyser
Longitude: 110°28' W
Lattitude: 47°14' N

SHEET 1: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR): 5/2/02
SURVEYOR 1: WT SURVEYOR 2: BS

	DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING				
1	FATIGUE CRACKING (SQUARE METERS)	0.0	0.0	0.0
2	BLOCK CRACKING (SQUARE METERS)	0.0	0.0	0.0
3	EDGE CRACKING (METERS)	0.0	0.0	0.0
4	LONGITUDINAL CRACKING			
	4a. Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
	4b. Non-Wheelpath (Meters)	0.0	0.0	0.0
	Length Sealed (Meters)	0.0	0.0	0.0
5	REFLECTION CRACKING AT JOINTS	Not Recorded		
6	TRANSVERSE CRACKING			
	Number of Cracks	0	0	0
	Length (Meters)	0.0	0.0	0.0
	Length Sealed	0.0	0.0	0.0
PATCHING AND POTHOLES				
7	PATCH / PATCH DETERIORATION (Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0
8	Potholes (Number)	0	0	0
	(Square Meters)	0.0	0.0	0.0

Location: Geyser
Longitude: 110°28' W
Lattitude: 47°14' N

SHEET 2: DISTRESS SURVEY

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 5/2/02
SURVEYOR 1: WT SURVEYOR 2: BS

DISTRESS TYPE		SEVERITY LEVEL N/A
SURFACE DEFORMATION		
9	RUTTING - REFER TO PROFILE DATA	
10	SHOVING (Number) (Square Meters)	0 0.0
SURFACE DEFECTS		
11	BLEEDING (Square Meters)	0.0
12	POLISHED AGGREGATE (Square Meters)	0.0
13	RAVELING (Square Meters)	0.0
MISCELLANEOUS DISTRESSES		
14	LANE-TO-SHOULDER DROPOFF - Not Recorded	
15	WATER BLEEDING AND PUMPING (Number) Length of Affected Pavement (Meters)	0 0.0
16	OTHER (Describe) No distress, chip sealed on Spring 2001 the only distress.	

Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 5/2/02

Pavement Temp:

Before_____ After_____

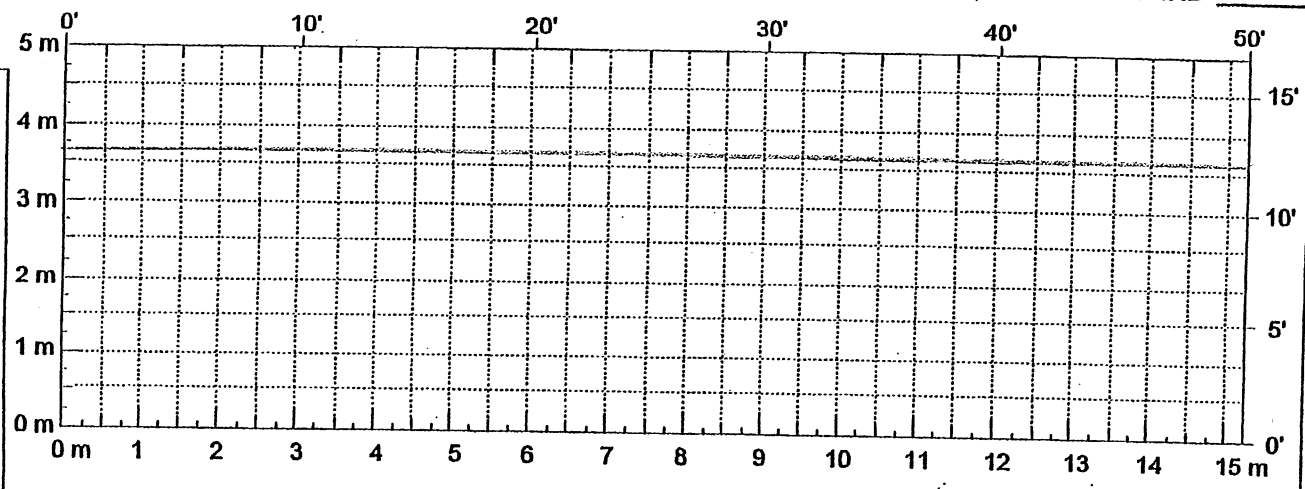
State Assigned ID _____

State Code _____

SHRP Section ID _____

Section Summary

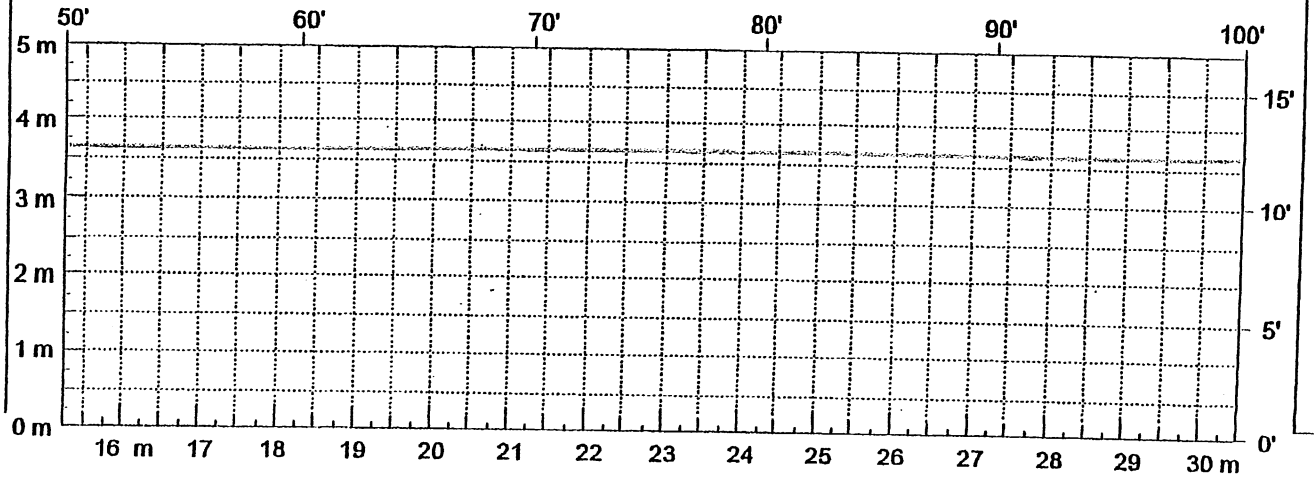
No distress.



Sheet Summary

NONE

Comments: _____



Comments: _____

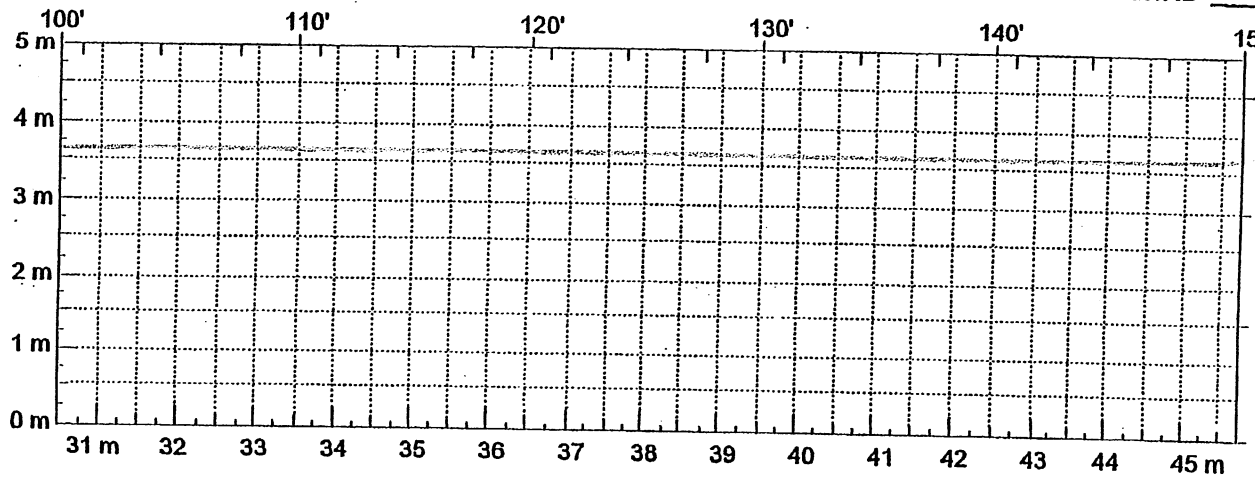
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 5/6/22

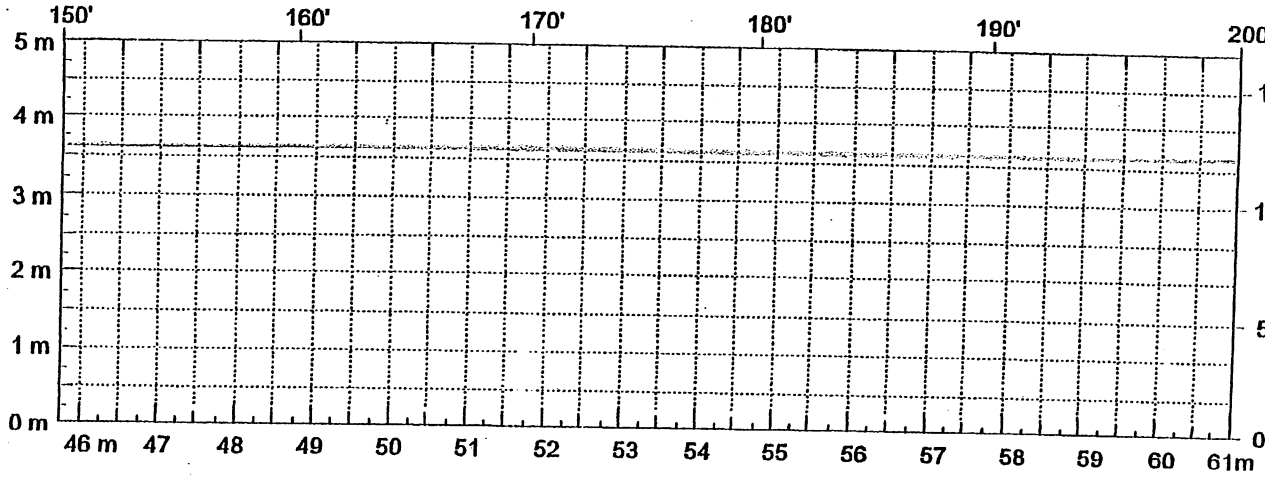
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

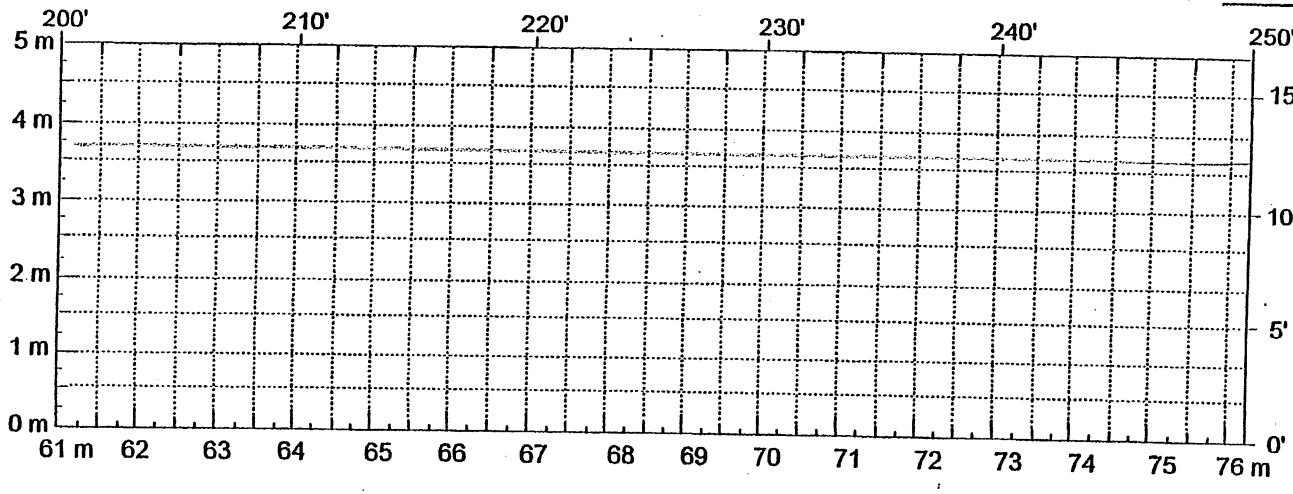
Reviewer: _____ Surveyors: WT/BS

Date: _____ Date: 5/2/02

State Assigned ID _____

State Code _____

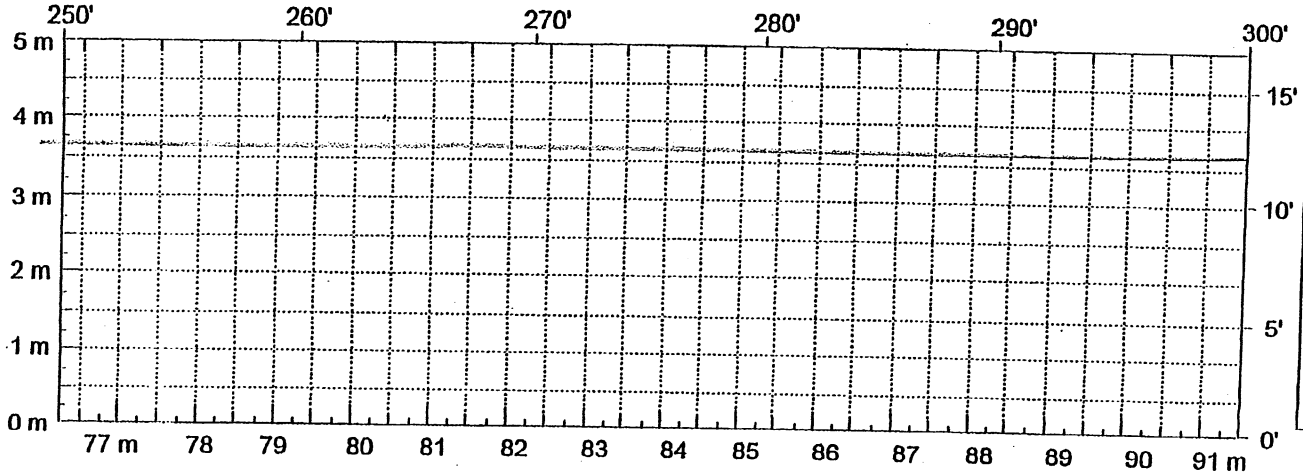
SHRP Section ID _____



Sheet Summary

none

Comments: _____



Comments: _____

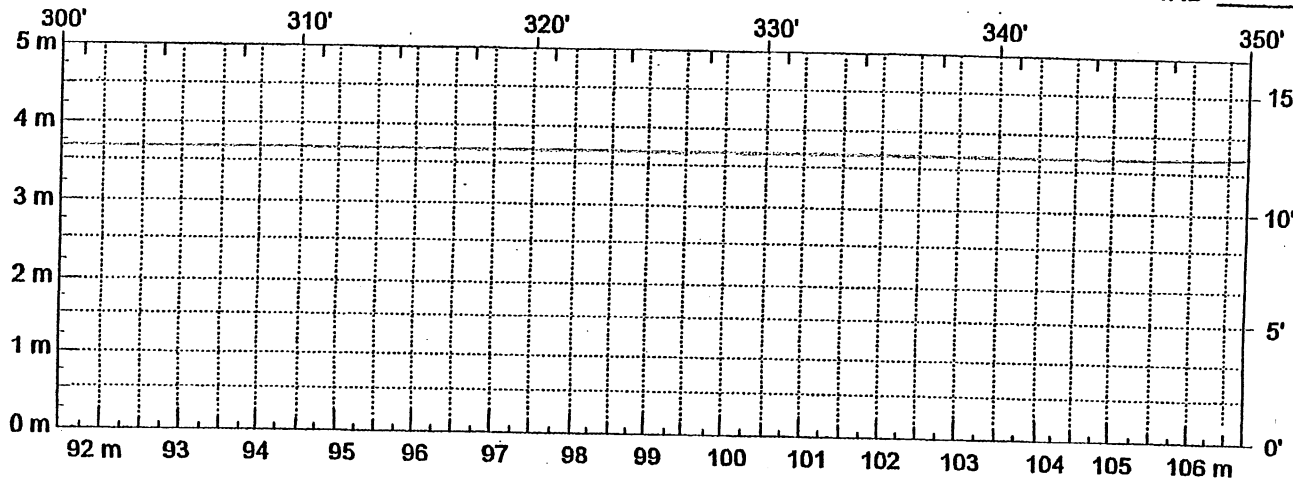
Reviewer: _____ Surveyors: AT|BS

Date: _____ Date: 5|2|02

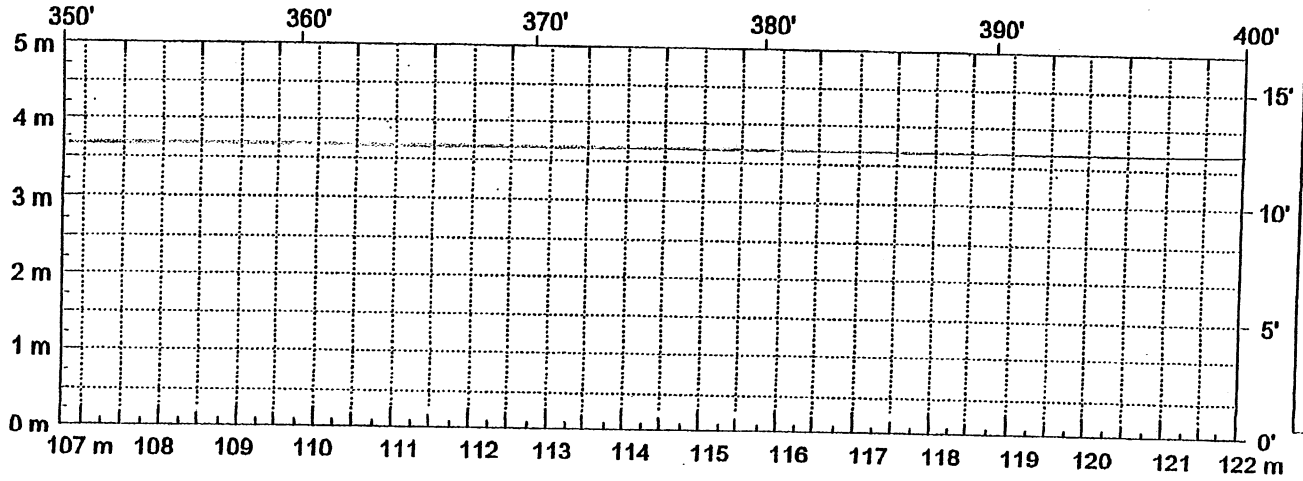
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

Reviewer: _____ Surveyors: CT [illegible]

Date: _____ Date: 5/6/02

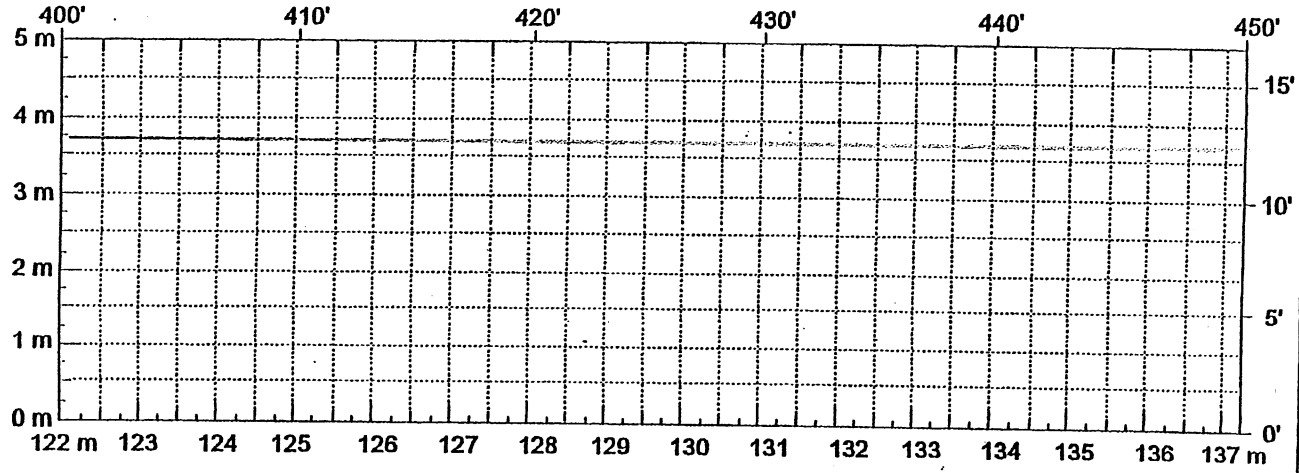
Pavement Temp:

After_____

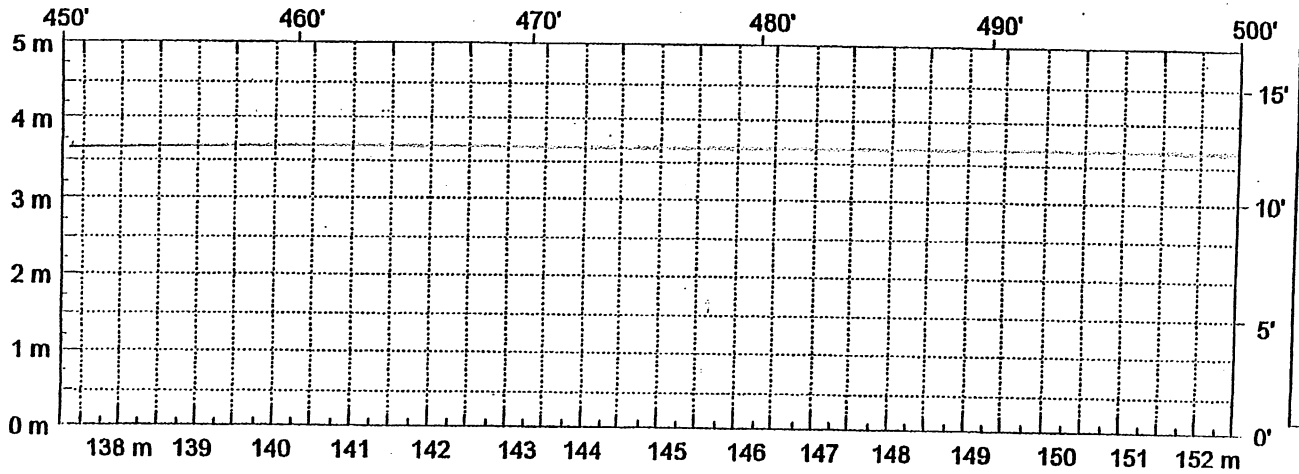
State Assigned ID _____

State Code _____

SHRP Section ID _____



Comments: _____



Comments: _____

Sheet Summary

NONE

Montana Performance Prediction Models Contract
Field Data Report

Location: Geyser
Longitude: 110°28' W
Lattitude: 47°14' N

FWD Data

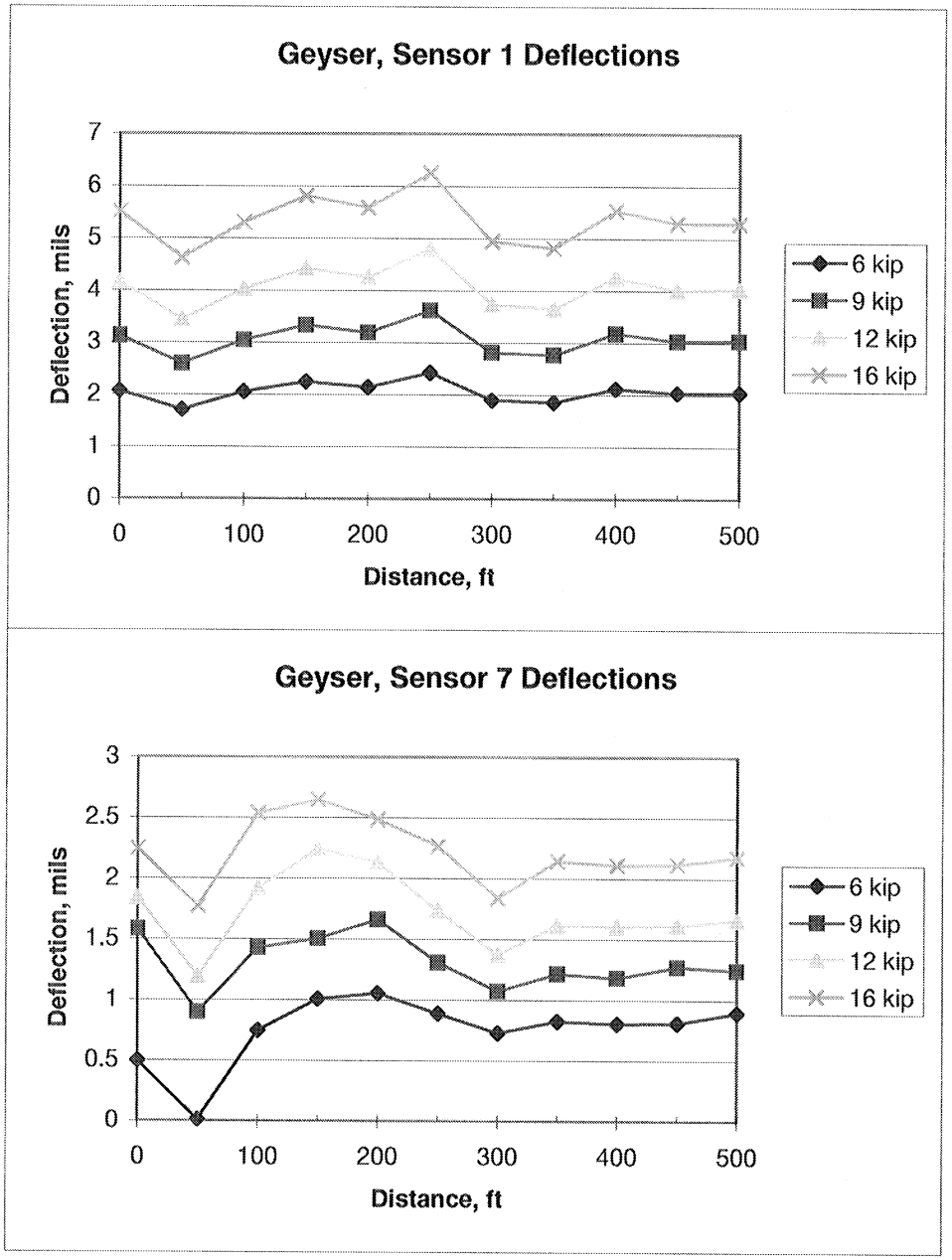
Test Date: 10/10/01

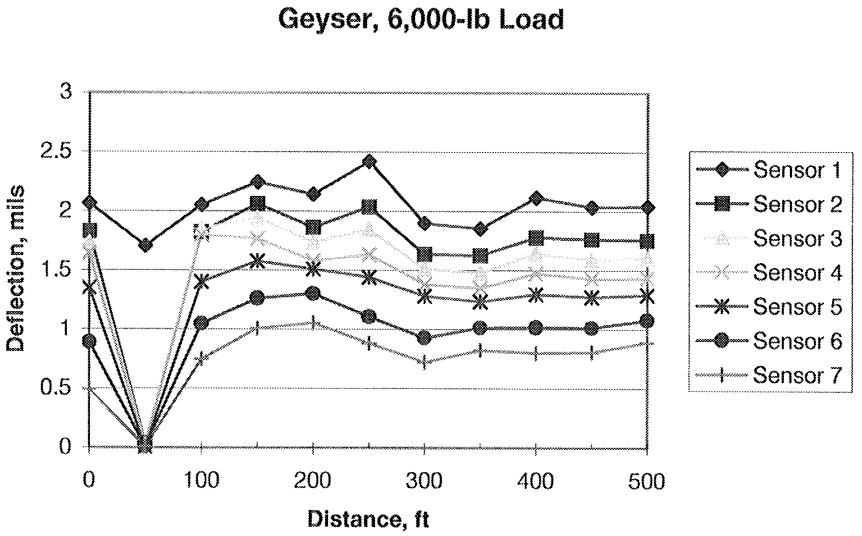
Layer	Material Type	Average Thickness in.
1	ACP	4.1
2	CSB	11.4
3	Base	25.5
4	Subgrade	-

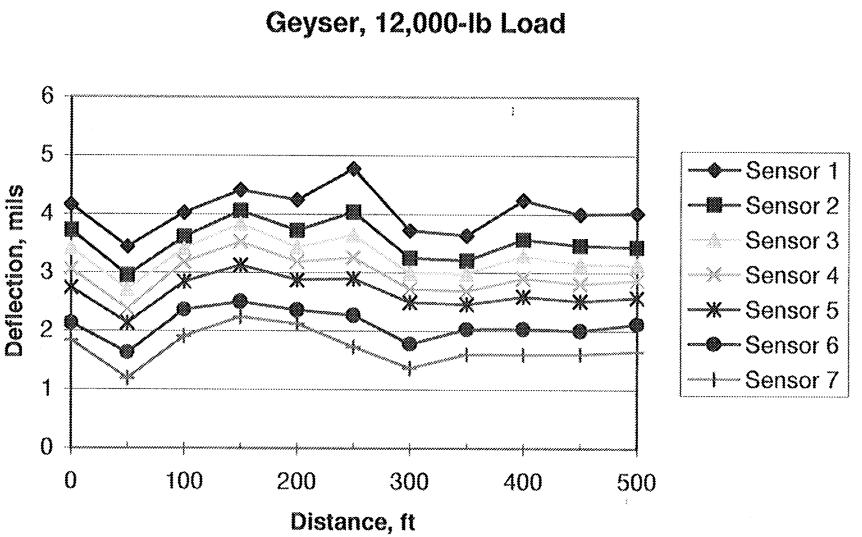
Station ft	Load kips	Deflection 1 mils	Deflection 2 mils	Deflection 3 mils	Deflection 4 mils	Deflection 5 mils	Deflection 6 mils	Deflection 7 mils
0+00	6.53	2.25	1.99	1.89	1.79	1.47	0.97	0.54
0+00	8.98	3.12	2.79	2.54	2.29	2.07	1.82	1.58
0+00	11.47	3.98	3.56	3.26	2.92	2.62	2.04	1.76
0+00	15.33	5.28	4.78	4.36	3.88	3.50	2.74	2.15
0+50	6.47	1.84	0.04	0.03	0.01	0.00	0.01	0.01
0+50	8.84	2.55	2.16	1.98	1.75	1.56	1.20	0.88
0+50	11.49	3.30	2.83	2.59	2.28	2.05	1.56	1.14
0+50	15.46	4.47	3.80	3.49	3.05	2.75	2.06	1.71
1+00	7.80	2.67	2.37	2.41	2.34	1.82	1.36	0.97
1+00	10.08	3.41	3.03	2.84	2.66	2.40	1.97	1.60
1+00	12.15	4.08	3.66	3.45	3.22	2.88	2.39	1.94
1+00	14.78	4.90	4.41	4.12	3.83	3.47	2.85	2.34
1+50	7.80	2.92	2.68	2.53	2.30	2.05	1.64	1.31
1+50	10.05	3.72	3.42	3.22	2.94	2.62	2.13	1.68
1+50	12.15	4.47	4.11	3.88	3.57	3.17	2.53	2.27
1+50	14.87	5.40	4.98	4.69	4.27	3.81	3.06	2.46
2+00	7.79	2.78	2.42	2.26	2.05	1.96	1.69	1.37
2+00	10.03	3.56	3.12	2.89	2.67	2.43	2.10	1.85
2+00	12.17	4.31	3.78	3.48	3.23	2.92	2.39	2.16
2+00	14.73	5.14	4.55	4.17	3.83	3.53	2.81	2.29
2+50	7.86	3.17	2.67	2.42	2.14	1.89	1.45	1.16
2+50	10.05	4.04	3.41	3.08	2.74	2.43	1.91	1.46
2+50	12.12	4.83	4.08	3.68	3.29	2.93	2.29	1.75
2+50	14.74	5.76	4.92	4.45	3.90	3.50	2.71	2.09

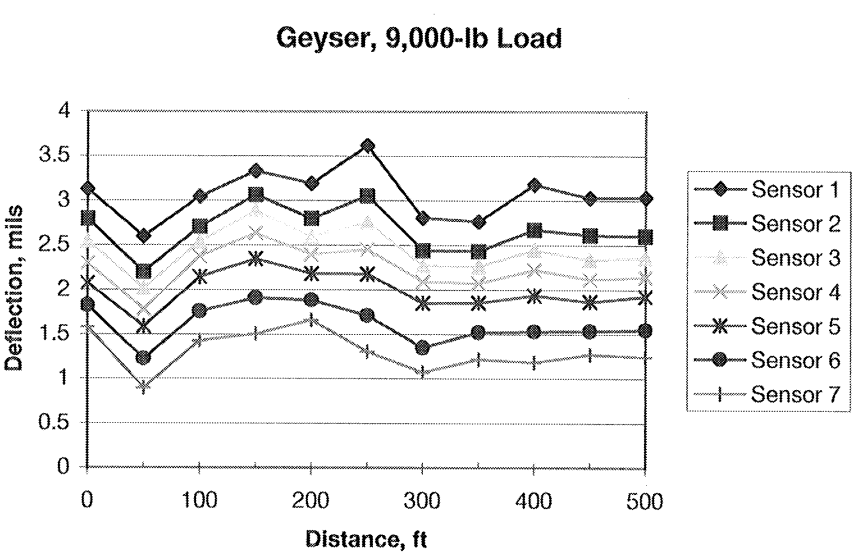
Station	Load	Deflection 1	Deflection 2	Deflection 3	Deflection 4	Deflection 5	Deflection 6	Deflection 7
ft	kips	mils	mils	mils	mils	mils	mils	mils
3+00	7.77	2.46	2.12	1.96	1.79	1.66	1.20	0.94
3+00	10.07	3.14	2.73	2.54	2.34	2.07	1.51	1.20
3+00	12.17	3.78	3.30	3.03	2.76	2.53	1.81	1.39
3+00	14.73	4.55	3.97	3.66	3.36	3.03	2.17	1.69
3+50	7.86	2.43	2.13	1.93	1.77	1.62	1.33	1.08
3+50	9.99	3.07	2.70	2.51	2.30	2.06	1.69	1.35
3+50	12.15	3.69	3.25	3.02	2.72	2.49	2.06	1.63
3+50	14.78	4.44	3.96	3.67	3.30	3.01	2.47	1.98
4+00	7.85	2.77	2.33	2.15	1.93	1.70	1.33	1.05
4+00	10.04	3.55	2.98	2.73	2.48	2.16	1.71	1.32
4+00	12.07	4.27	3.59	3.30	2.92	2.61	2.05	1.61
4+00	14.78	5.11	4.36	4.01	3.52	3.15	2.46	1.95
4+50	7.86	2.67	2.31	2.08	1.87	1.67	1.33	1.06
4+50	10.03	3.38	2.91	2.60	2.36	2.08	1.71	1.42
4+50	12.08	4.03	3.49	3.16	2.83	2.53	2.02	1.62
4+50	14.75	4.88	4.19	3.79	3.37	3.03	2.45	1.95
5+00	7.79	2.65	2.28	2.08	1.86	1.68	1.40	1.16
5+00	10.04	3.39	2.90	2.63	2.39	2.15	1.73	1.39
5+00	12.11	4.06	3.47	3.16	2.90	2.60	2.14	1.67
5+00	14.80	4.89	4.25	3.80	3.45	3.11	2.55	2.01

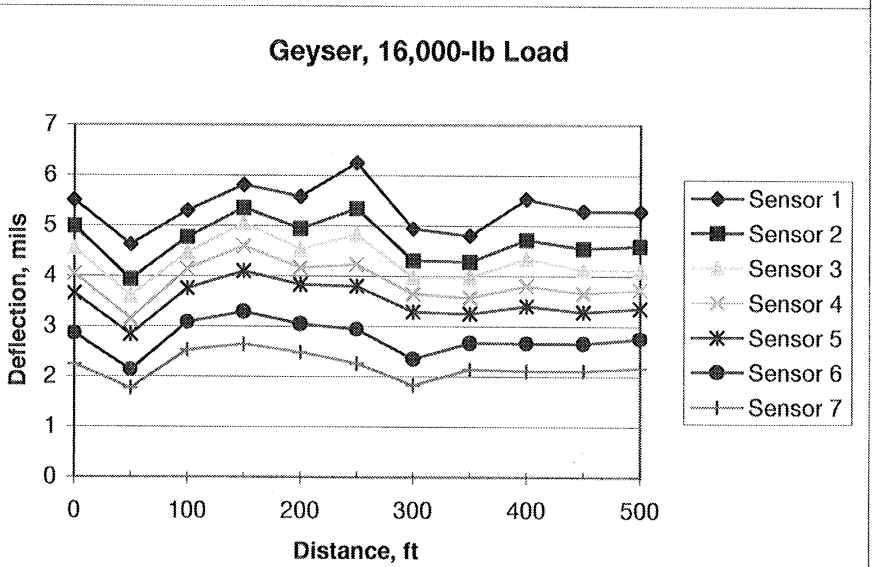
Montana DOT - Performance Prediction Models
FWD Deflections




Geyser, 6,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Geyser, 12,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Geyser, 9,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7


Geyser, 16,000-lb Load
Deflection, mils
Distance, ft
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7

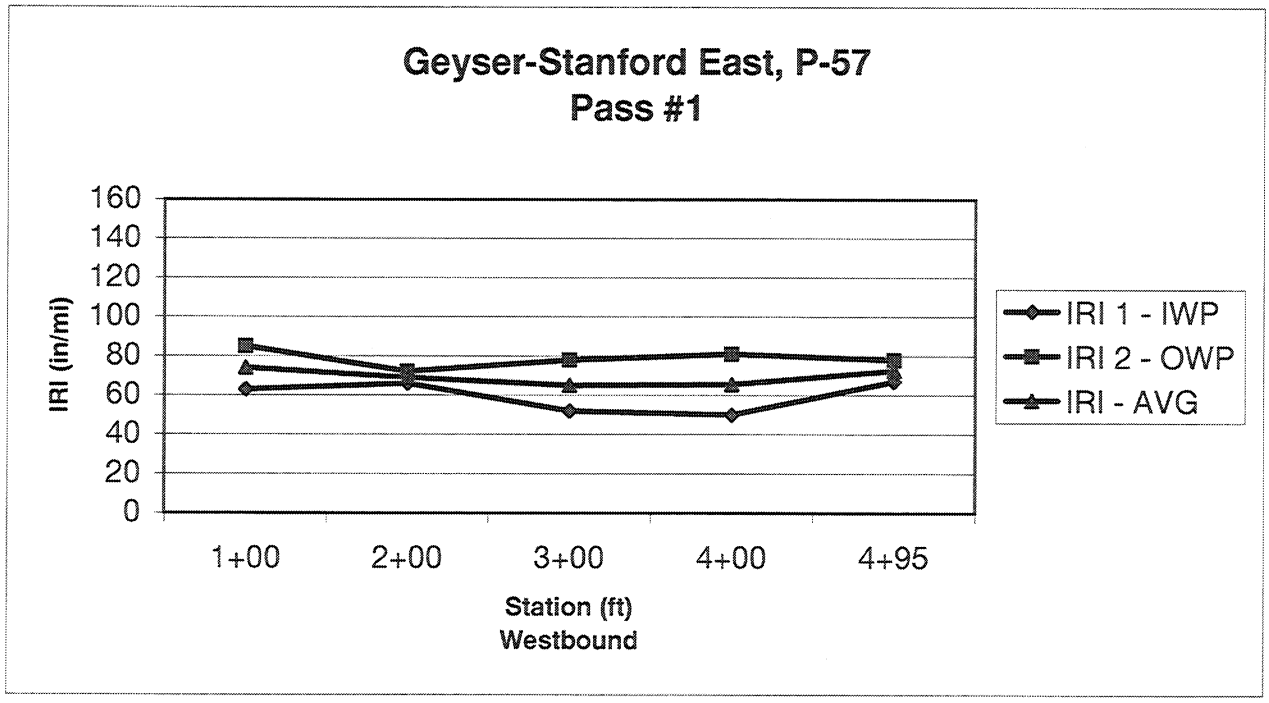
Montana Performance Prediction Models Contract
Field Data Report

Location: Geyser
Longitude: 110°28' W
Lattitude: 47°14' N

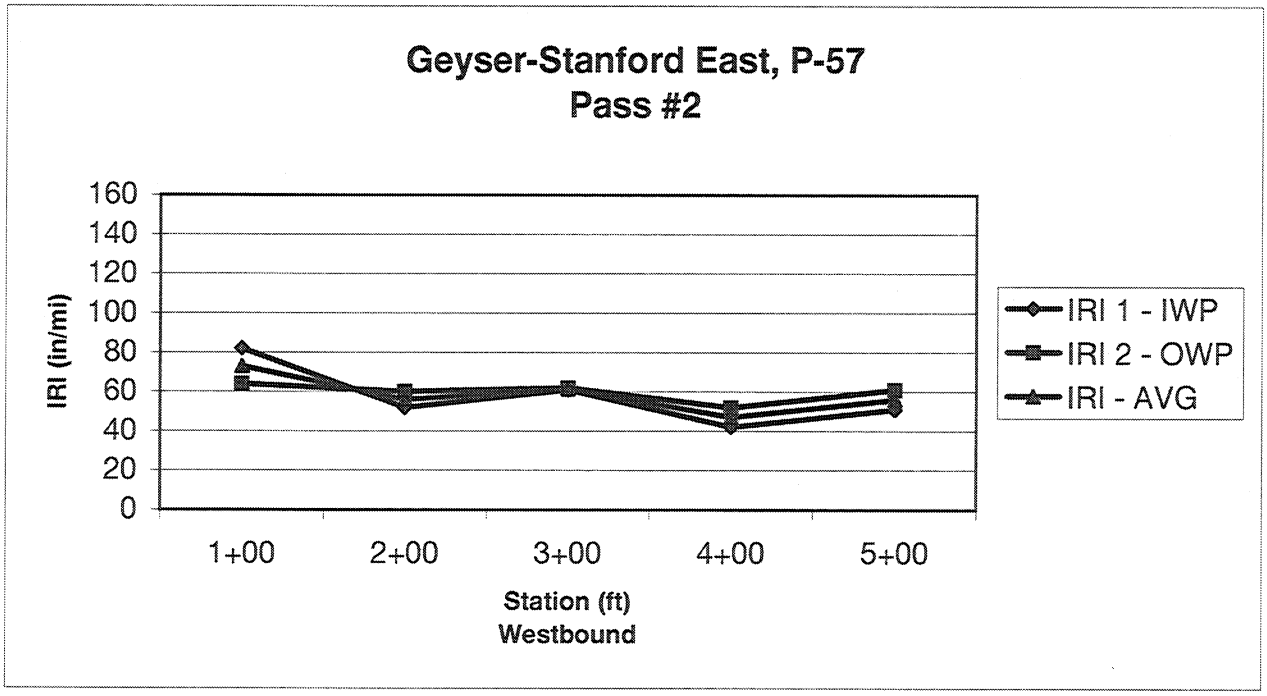
Profile Data

Test Date: 9/25/01

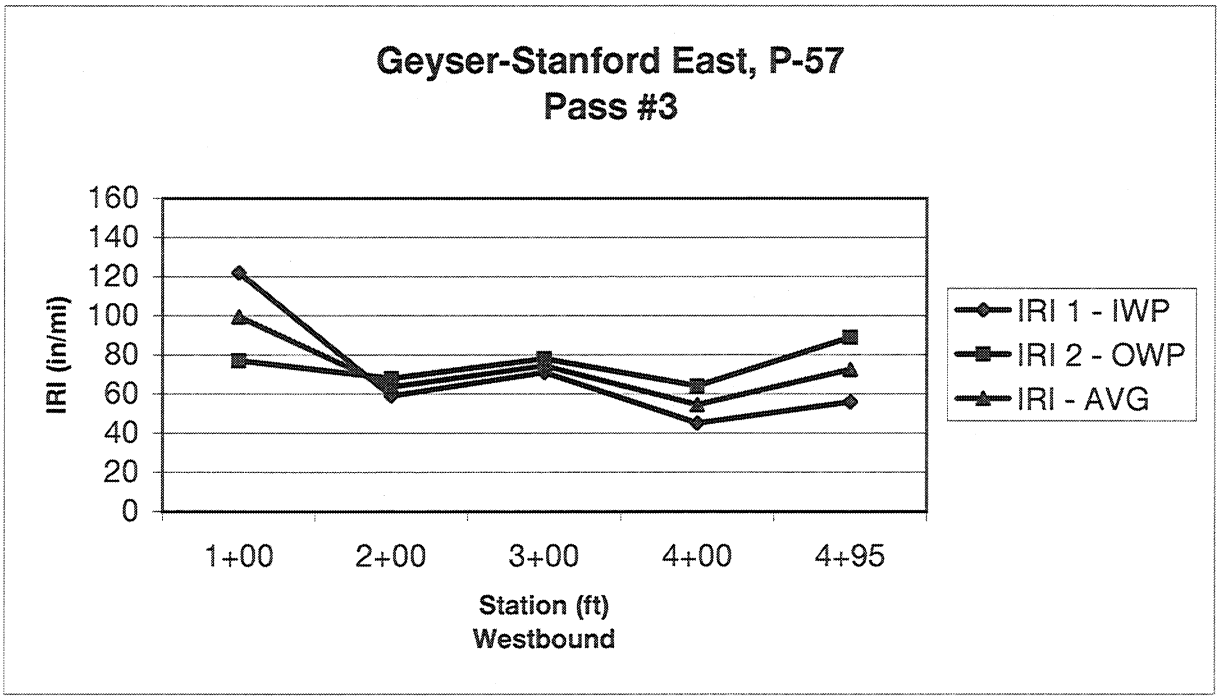
Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.01	0.010	63	85	74
2+00	100	200	100	0.02	0.013	66	72	69
3+00	200	300	100	0.01	0.009	52	78	65
4+00	300	400	100	0.02	0.014	50	81	66
4+95	400	495	95	0.02	0.012	67	78	73
AVG.				0.016	0.012	59.6	78.8	69.2
STD.				0.005	0.002	8.019	4.764	4.040



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.01	0.009	82	64	73
2+00	100	200	100	0.01	0.011	52	60	56
3+00	200	300	100	0.02	0.011	61	62	62
4+00	300	400	100	0.00	0.000	42	52	47
5+00	400	500	100	0.01	0.010	51	61	56
AVG.				0.010	0.008	57.6	59.8	58.7
STD.				0.007	0.005	15.209	4.604	9.537



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.01	0.010	122	77	100
2+00	100	200	100	0.00	0.001	59	68	64
3+00	200	300	100	0.01	0.008	71	78	75
4+00	300	400	100	0.01	0.008	45	64	55
4+95	400	495	95	0.01	0.011	56	89	73
AVG.				0.008	0.008	70.6	75.2	72.9
STD.				0.004	0.004	30.188	9.731	16.861



Station	From	To	Length	Rut Depth Average	Rut Depth Std.Dev.	IWP IRI	OWP IRI	AVG. IRI
ft.	ft.		ft.	in.		in./mi.		
1+00	0	100	100	0.01	0.010	89	75	82
2+00	100	200	100	0.01	0.008	59	67	63
3+00	200	300	100	0.01	0.009	61	73	67
4+00	300	400	100	0.01	0.007	46	66	56
5+00	400	500	100	0.01	0.011	58	76	67
AVG.				0.011	0.009	62.6	71.3	66.9
STD.				0.002	0.001	15.964	4.833	9.693